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Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 4. Bat fauna of Syria: distribution, systematics, ecology

Petr BENDA[1,2,12], Michal ANDREAS[3], Dieter KOCK[4], Radek K. LUČAN[5], Pavel MUNCLINGER[2], Petra NOVÁ[2], Ján OBUCH[6], Katarzyna OCHMAN[7], Antonín REITER[8], Marcel UHRIN[9,10] & Dita WEINFURTOVÁ[11]

[1] Department of Zoology, National Museum (Natural History), Václavské nám. 68, CZ–115 79 Praha 1, Czech Republic
[2] Department of Zoology, Faculty of Science, Charles University, Viničná 7, CZ–128 44 Praha 2, Czech Republic
[3] The Silva Tarouca Research Institute for Landscape and Ornamental Gardening,
Květnové nám. 391, Průhonice, CZ–252 43, Czech Republic
[4] Senckenberg Museum and Research Institute, Senckenberg-Anlage 25, D–60325 Frankfurt am Main, Germany
[5] Department of Zoology, University of South Bohemia, Branišovská 31, CZ–370 05 České Budějovice, Czech Republic
[6] Botanical Garden, Comenius University, SK–038 15 Blatnica, Slovakia
[7] Institute of Systematics and Evolution of Animals, PAS, Sławkowska 17, PL–31-016 Kraków, Poland
[8] South Moravian Museum in Znojmo, Přemyslovců 8, CZ–669 45 Znojmo, Czech Republic
[9] Muránska planina National Park, J. Kráľa 12, SK–050 01 Revúca, Slovakia
[10] Institute of Forest Ecology, SAS, Štúrova 2, SK–960 53 Zvolen, Slovakia;
[11] Museum of the Bohemian Karst, Husovo nám. 88, CZ–266 01 Beroun, Czech Republic
[12] editor and corresponding author: petr.benda@nm.cz

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Abstract. A complete list of bat records available from Syria was compiled from literature and from new records, based on field studies and examination of museum specimens. The record review is complemented by distribution maps, summaries of the distributional statuses of particular species, files of field observations, reviews of taxonomy, and data on feeding ecology. To some species sheets, also the echolocation data are added. From the territory of the modern Syrian Arab Republic, 290 records of 27 bat species belonging to eight families are reported; viz. *Rousettus aegyptiacus* (Geoffroy, 1810) (5 record localities), *Rhinopoma microphyllum* (Brünnich, 1782) (2), *Rhinopoma hardwickii* Gray, 1831 (4), *Taphozous nudiventris* Cretzschmar, 1830 (9), *Rhinolophus ferrumequinum* (Schreber, 1774) (25), *R. hipposideros* (Bechstein, 1800) (10), *R. euryale* Blasius, 1853 (2), *R. mehelyi* Matschie, 1901 (6), *R. blasii* Peters, 1866 (3), *Asellia tridens* (Geoffroy, 1813) (10), *Myotis myotis* (Borkhausen, 1797) (6), *M. blythii* (Tomes, 1857) (10), *M. nattereri* (Kuhl, 1817) (6), *M. emarginatus* (Geoffroy, 1806) (5), *M. aurascens* Kusjakin, 1935 (4), *M. capaccinii* (Bonaparte, 1837) (13), *Eptesicus serotinus* (Schreber, 1774) (13), *E. bottae* (Peters, 1869) (10), *E. anatolicus* Felten, 1971 (4), *Hypsugo savii* (Bonaparte, 1837) (11), *Pipistrellus pipistrellus* (Schreber, 1774) (16), *P. kuhlii* (Kuhl, 1817) (69), *Nyctalus noctula* (Schreber, 1774) (4), *Otonycteris hemprichii* Peters, 1859 (13), *Plecotus macrobullaris* Kuzjakin, 1965 (5), *Miniopterus schreibersii* (Kuhl, 1817) (9), and *Tadarida teniotis* (Rafinesque, 1814) (16). The records labelled from Syria in the historical broader sense (which included also the modern Lebanon, Jordan, Palestine, and parts of southern Turkey) and thus of indefined origin, were also added and discussed. *Eptesicus anatolicus*, which is here considered a separate species according to results of profound morphological analysis, is in Syria recorded for the first time. From the territory currently ruled by the Syrian Arab Republic (i.e., without the Golan Heights), *R. hipposideros*, *M. nattereri*, *H. savii*, *N. noctula*, and *T. teniotis* are reported for the first time. The reviews of taxonomic opinions concerning particular species, supplemented in some cases by original analyses, present discussions and revisions of taxonomy of Syrian populations, namely in *Taphozous nudiventris*, *Rhinolophus ferrumequinum*, *R. euryale*, *R. mehelyi*, *Myotis myotis*, *M. nattereri*, *M. emarginatus*, *Eptesicus serotinus*, *E. bottae*, *Hypsugo savii*, *Otonycteris hemprichii*, and *Miniopterus schreibersii*. The name *Rhinolophus* (*Euryalus*) *judaicus* Andersen et Matschie, 1904 is found to be a synonym of the name *R. mehelyi* Matschie, 1901 instead of *R. euryale* Blasius, 1853. New interpretations on the type localities are discussed and/or suggested (*Vespertilio Microphyllus* Brünnich, 1782, *Taphozous kachhensis babylonicus* Thomas, 1915, *Rhinolophus blasii* Peters, 1866, and *Myotis Escalerai* Cabrera, 1904).

Distribution, taxonomy, ecology, echolocation, Chiroptera, Middle East, biodiversity, Palaearctic Region

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INTRODUCTION

Although the geographical term ‘Syria’ has had slightly different meanings throughout history, in every time it represented an area in the northwestern part of the Arabian peninsula, lying on the crossroads of cultural and environmental influences between the West and the Orient, between Afro-tropics and Palaearctic, or between the fertile inner Mediterranean and arid Arabia. Moreover, this region in its widest sense remains important for most of human inhabitants of the western Palaearctic since it represents a cultural cradle both in symbolic sense, covering sites important for various religions including the most confessed ones, and in historical sense since the earliest Neolithic agricultural societies founded their roots just there. Maybe for these reasons, the attraction of Syria for naturalists remained for a long time far behind the attraction for archaeologists and/or art historians, although the Syrian territory is situated at the transition of two main biomes of the southwestern Palaearctic, the Mediterranean arboreal and the Saharo-Sindian eremial. The former one reaches here its southern fringe, while in the latter one, Syria lies on the northernmost extension of its margin running from North Africa to India. Therefore, the territory of Syria is considered ‘crossroads of crossroads’ (Blondel & Aronson 1999).

The transition in structure of vegetation expressed in the phytogeographical zonation proposed by Zohary (1973) (Fig. 1) shows probably the best documented and the most apparent nature crossroad of the Levantine region. In Syria, there meet Mediterranean arboreal communities of woodland climaxes and steppe-maquis, creating a relatively narow strip along the Mediterranean coast and longitudinally oriented mountain ranges along the Rift, and Mesopotamian steppes and semideserts, covering larger parts of central and eastern Syria (easternmost portion is also known as the Syrian Desert). Whereas the Mediterranean arboreal zones have floristic and faunal rela-

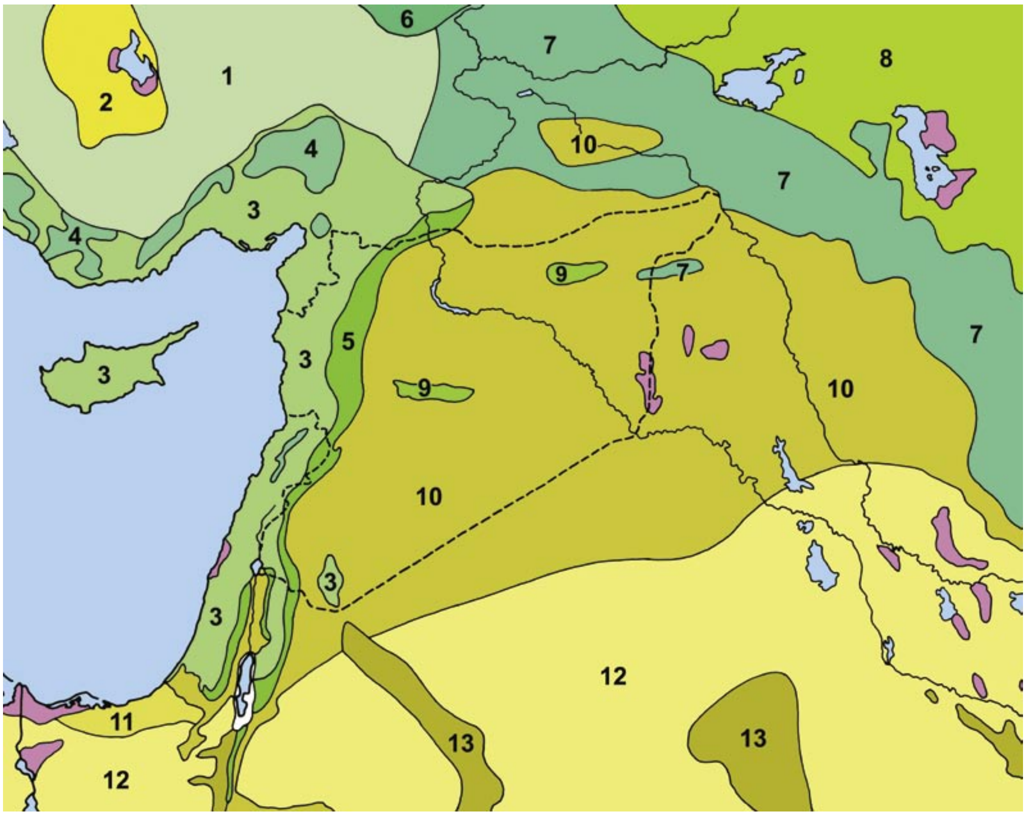

Fig. 1. Phytogeographical division of the Eastern Mediterranean region (after Zohary 1973, slightly simplified): 1 – xero--euxinian steppe-forests; 2 – Central Anatolian dwarf-shrub steppes; 3 – Mediterranean woodland climaxes; 4 – Mediterranean subalpine forests; 5 – Mediterranean steppe-maquis; 6 – sub-euxinian mesic deciduous and mixed forests; 7 – xerophilous deciduous steppe forests and supported climax areas; 8 – mosaics of Irano-Turanian steppes and forests; 9 – *Pistacia-Amygdalus* steppe forests; 10 – Mesopotamian steppes and semi-deserts; 11 – Saharo-Arabian coastal sand vegetation; 12 – Saharo-Arabian desert vegetation; 13 – Sudanian and Sub-Sudanian desert and savanna vegetation; violet areas [14] – halo- and hydrophytic vegetation. Dashed line = state border of Syria.

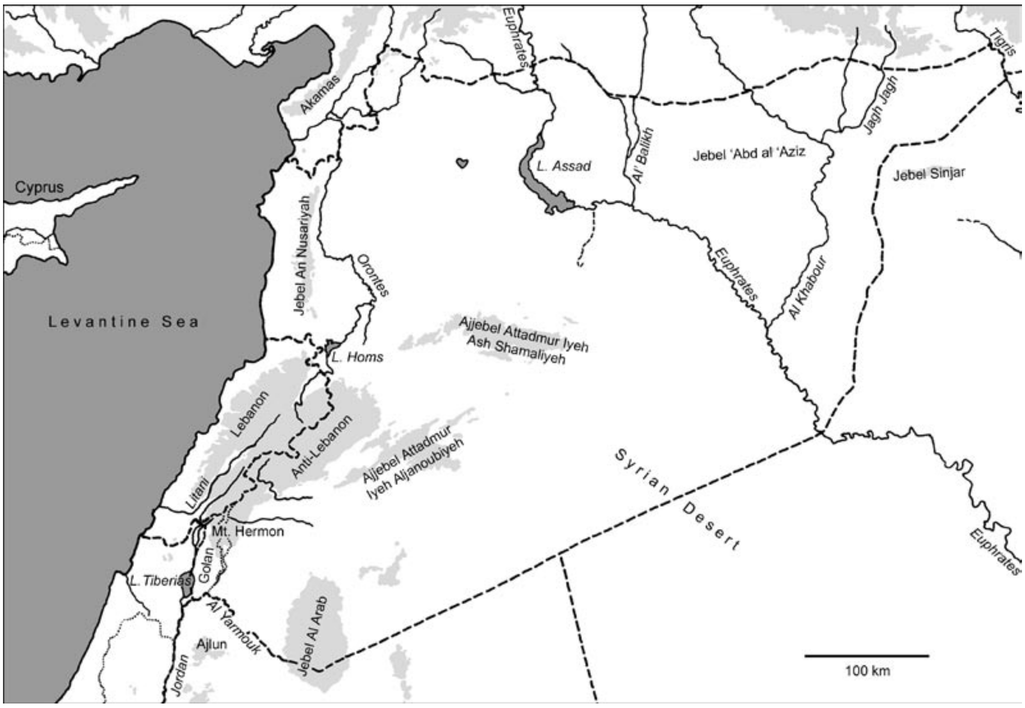

Fig. 2. General map of Syria; main geographical features mentioned in the text (shaded, area above 900 m a. s. l.).

tions mostly to southern Anatolia, the Balkans and eastern Mediterranean islands, partly also to some North African regions, the Mesopotamian arid areas show best associations with the biota of Arabia in the south and the Irano-Turanian region in the east.

Although the territory of the present Syrian Arab Republic (185.180 km^2, see Fig. 2) covers a large part of the area of historical Syria (see the Definition of study area), it remains one of its least known areas concerning mammalian fauna and especially concerning bats. While bats have been studied in the adjacent countries and the results of these surveys were published, viz. Lebanon (Lewis & Harrison 1962), Turkey (Çağlar 1965), Israel & Palestine (Makin 1977), Jordan (Qumsiyeh et al. 1992), Iran (DeBlase 1980), or a list of bat fauna was included in the reviews of mammals, viz. Iraq (Hatt 1959), bat as well as mammal faunas of Syria have been reviewed only as a part of the surveys of Arabian mammals (Harrison 1964a, Harrison & Bates 1991) or in summaries of mammals of the areas only partly covering the Syrian territory (Atallah 1977, Qumsiyeh 1996). The only review focused on Syrian mammals was published by Kumerloeve (1975b), however, concerning bats it presents the same level of knowledge as Harrison (1964a). There are numerous papers, mainly from the recent years, providing data on the distribution and biology of mammals of Syria, particularly of smaller members of the terrestrial groups (e.g., Misonne 1957, von Lehmann 1965, Kock & Kinzelbach 1982, Peshev 1991, Kock & Ebenau 1996, Kock 1998, Shehab et al. 1999a, b, Uhrin et al. 2000, Benda & Obuch 2001, Hutterer & Kock 2002, Vohralík et al. 2002, Shehab et al. 2003, and some others, for older papers see the review by Kumerloeve 1975b). Other similar data are included in the studies aimed at the diet of owls

Table 1. Composition of the bat fauna of Syria and the number of records of particular species according to subsequent reviews. Asterisks denote numbers of records fully or partially missidentified both geographically and/or specifically

species	Harrison 1964a	Kumerloeve 1975b	Atallah 1977	Harrison & Bates 1991	present review
Rousettus aegyptiacus	–	–	–	–	5
Rhinopoma microphyllum	–	–	–	–	2
Rhinopoma hardwickii	–	–	–	–	4
Taphozous nudiventris	–	–	–	–	9
Rhinolophus ferrumequinum	1*	–	–	1*	25
Rhinolophus hipposideros	–	–	–	–	10
Rhinolophus euryale	2*	?	2*	2*[?]	2
Rhinolophus mehelyi	–	?	–	–	6
Rhinolophus blasii	1	1	1	1	3
Asellia tridens	–	1	1	2	10
Myotis myotis	1	1	1	1	6
Myotis blythii	1	1	1	1	10
Myotis nattereri	–	–	–	–	6
Myotis emarginatus	–	–	–	–	5
Myotis aurascens	–	–	–	–	4
Myotis capaccinii	–	–	–	–	13
Eptesicus serotinus	–	–	–	–	13
Eptesicus bottae	–	–	–	–	10
Eptesicus anatolicus	–	–	–	–	4
Hypsugo savii	–	–	–	–	11
Pipistrellus pipistrellus	–	–	–	–	16
Pipistrellus kuhlii	4	1	2	6	69
Nyctalus noctula	–	–	–	–	4
Otonycteris hemprichii	(1)	1	1	1(2)	13
Plecotus sp.	1	1	1	1	5
Miniopterus schreibersii	1	1	1	1	9
Tadarida teniotis	–	–	–	–	16
total (no. species)	8–9	8	9	10	27
total (no. records)	13	8	11	18	290
records per species	1.4	1.0	1.2	1.8	10.8

(Obuch 2001, Shehab 2004, 2005, Shehab et al. 2000, 2004, 2006a). However, these papers give records of bats only exceptionally.

Despite absence of a detailed summary on faunal records and biology of bats in Syria, many reports appeared throughout history which have succesivelly drawn the picture of bat fauna of this country (see Table 1). Besides some rather old papers which include occasional bat records, either historical ones and/or those in which the exact geographical reference within Syria in its broad sense is lacking (Russel 1794, Kolenati 1856b, Fitzinger 1869, 1870a, Peters 1871, Dobson 1876, 1878, Anderson 1881, Tristram 1884, Nehring 1886, Jentink 1887, 1888, Trouessart 1879, de Seabra 1898, Andersen 1905a, 1906, Cabrera 1912, Harrison 1953, Spitzenberger et al. 2006), and parasitological literature (Theodor 1954b, 1967, Hůrka 1964, Walter & Ebenau 1997)*, several other papers describe bat records from Syria in more details. The first of them comes from the era of the Ottoman rule of the present Syrian territory; von Wettstein (1913) reported four species (*Rhinolophus euryale*, *R. blasii*, *Pipistrellus kuhlii*, *Miniopterus schreibersii*) collected by Victor Pietschmann during his 'Mesopotamia Expedition' in 1910 (results of the second Pietschmann's journey to Syria, the 'Armenien Expedition' from 1914, remain mostly unpublished). Trouessart & Kollmann (1923) published records coming from almost the same time, i.e. material of four bat species (*Rhinolophus euryale*, *Myotis myotis*, *Pipistrellus kuhlii*, *Plecotus auritus*) collected by Henri Gadeau de Kerville in 1908 in southwestern Syria. Aharoni (1930) gave a record of *Vespertilio murinus* [= *Myotis myotis*] from Baniyas in the Jordan Valley. Records of two bat species (*Myotis myotis* and *M. blythii*) made in ruins of the famous Syrian crusader castle of Krak des Chevaliers by David Potter in the winter 1952 were published in the taxonomic paper by Harrison & Lewis (1961). Thus, based on these more or less exactly localised records, Harrison (1964a) summarised the occurrence of seven bat species in Syria (however, some of them were found misidentified); he also added one new record of *P. kuhlii* from Damascus and one not exactly localised record of *Otonycteris hemprichii* from the Syrian Desert.

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* NOTE. Additionally, Theodor (1954b) mentioned *Nycteribosca kollari* Frauenfeld, 1855 (Diptera: Streblidae) to be hosted by *Rhinopoma microphyllum* [s.l.], *Rhinolophus ferrumequinum*, *R. blasii*, *R. euryale*, *R. hipposideros*, *R. mehelyi*, *Asellia tridens*, *Myotis myotis*, and *Miniopterus schreibersii* from 'Algerien, Ägypten, Palästina, Syrien, Cypern (?), Sardinien, Südfrankreich, Portugal'. Thus, he observed some of these bat species also in Syria *s.l.* Moreover, Hůrka (1964) noted a record of two specimens of *Penicillidia dufouri* (Westwood, 1835) (Diptera: Nycteribiidae) labelled 'Syrien, Ehrenberg leg.', but without giving a host bat species.

Two additional bat species were reported from Syria by Sana Atallah; the first Syrian record of *Asellia tridens* from Tadmor (Atallah & Harrison 1967) and the first precise record of *Otonycteris hemprichii* from Al Qaryatein (Harrison 1972, Atallah 1977). Spitzenberger (1979, 1996) presented

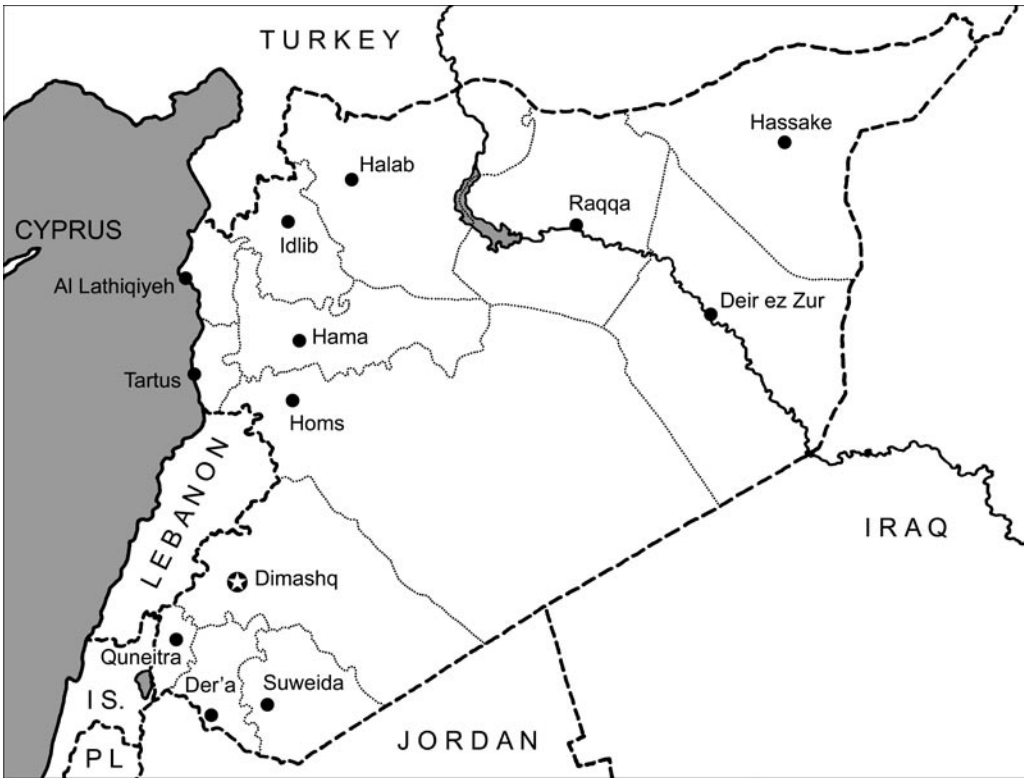

Fig. 3. Current political division of the territory of the Syrian Arab Republic; IS. = Israel, PL = Palestine Lands.

records of *Myotis myotis* and *M. blythii* made by V. Pietschmann in 1914 and an additional record of *M. blythii* from the Golan Heights. Further distribution data on four bat species previously known from Syria (*A. tridens*, *M. myotis*, *M. blythii*, *P. kuhlii*) are included in papers by Nader & Kock (1983c), Nadachowski et al. (1990) and Ebenau (1993). At that time, Harrison & Bates (1991) reviewed 10 bat species to be known to occur in Syria (Table 1).

During the speleological survey of karst phenomena in the Euphrates Valley, mainly in the extensive system of the Cater Magara cave (Voigt 1992), Carsten Ebenau significantly contributed to the knowledge of bat fauna of Syria (Ebenau 1994, 1996). Along with records of three previously found species (*A. tridens*, *P. kuhlii*, *M. schreibersii*), Ebenau reported occurrence of six species new to the Syrian fauna (*Taphozous nudiventris*, *Rhinolophus ferrumequinum*, *R. mehelyi*, *Myotis capaccinii*, *Eptesicus serotinus*, and *E. bottae*). The first record of *Myotis emarginatus* in Syria was published by Benda (1996) and that of *Rousettus aegyptiacus* by Shehab & Mamkhair (2004). New records of plecotine bats in Syria along with their taxonomic revision (all were identified as *Plecotus macrobullaris*) were reported by Benda et al. (2004c) and Juste et al. (2004). Finally, Shehab et al. (2004) found five rather rare bat species in pellets of the barn owl from the Euphrates Valley (*T. nudiventris*, *M. capaccinii*, *E. bottae*, *P. kuhlii*, *O. hemprichii*). However, a large amount of bat records made mainly in the 1990s were reported by Mendelssohn & Yom-Tov (1999) from the Syrian territory occupied by Israel since 1967, the Golan Heights (altogether 19 bat species, including seven ones mentioned for the first time for Syria, *Rhinopoma muscatellum*, *R. hardwickii*, *Myotis mystacinus* [s.l.], *Hypsugo savii*, *Pipistrellus pipistrellus* [s.l.], *Nyctalus noctula*, and *Tadarida teniotis*).

Up to present time, 26 species of bats are known to occur in Syria. Here, we present the first review of all available bat records from Syria in the modern sense as well as some data on bat biology from this area where such knowledge has been rather scarce. Most of them are represented by the results of eight trips to Syria conducted from 1988 to 2005 (incl.) and revisions of museum material from several collections throughout Europe and the Levant. With the present paper we supplement the summaries on bat fauna of the northern regions of the Eastern Mediterranean yet published (Benda & Horáček 1998, Hanák et al. 2001, Benda et al. 2003b) and emphasise the quite specific faunal situation in the southeastern part of the region, much different from the territories previously reviewed.

MATERIAL AND METHODS

Definition of study area

In this paper, the term Syria is defined as the territory of the Syrian Arab Republic in the boundaries before 1967, i.e. to include the Golan Heights (see Figs. 2, 3). However, in the 18–19th and early 20th centuries the name Syria was vaguely used for several Levantine provinces of the Ottoman Empire. At that time, the designation 'Syria' comprised the present Lebanon, Palestine, Israel, 'Trans-Jordan' (i.e. not all of the present-day Jordan), large part of the Turkish province of Hatay, and modern Syria or at least its larger western part. Such use of the term Syria in natural history literature can be found e.g. in Volney (1787) or Browne (1799); and specifically for the distribution of bats e.g. in Anderson (1902), who wrote about *Rousettus aegyptiacus*: "it is present [...] in Syria as far north as the Lebanon district", i.e. completely outside the area of modern Syria.

The geographical name 'Syria' was introduced by ancient Greeks as a shortened name of the realm of Assyria. The definition of this territory approximately covers the present-day states of Syria and Lebanon; between Mediterranean shore and the upper Euphrates and from the Taurus Mts to the borders of Palestine. However, in the course of history the term Syria often has coincided with the terms 'the Great Syria' and/or 'Syropalestine'; which is an area between the Mediterranean Sea in the west and the Syrian Desert in the east (this border was unstable throughout history), and the Taurus Mts in the north and Sinai and the Gulf of Aqaba in the south. For a long time, this broader understanding of the name Syria remained in a wide use.

Until 1920, the territory named Syria was a group of provinces of the Ottoman Empire. In that time, Syria territorially corresponded with the above defined 'Syropalestine'. When the Ottoman Empire broke up in 1920, a new state was created under the name ‘the Great Syria’. It covered present-day Syria, Lebanon and most of the Turkish province of Hatay. In 1922, this territory was occupied by French army and continued as ‘the Syrian Union’ or ‘the State of Levant’, under French mandate.

The Syrian Union (as the French mandate territory) was composed of five autonomous states and/or territories (Fig. 4): (1) the Republic of Syria, or ‘Damascus & Aleppo’ (with the capital of Damascus); (2) the Great Lebanon (capital Beirut), which declared independence in 1926 (under the French mandate) and in 1941 the independent Republic of Lebanon was proclaimed; (3) Alawitia (Alaouites), from 1930 Lattaqia (Lattaquie; capital Lattaqia) – in 1922–1926 an ‘independent republic’, in 1926–1941 an autonomous part of Syria, since 1942 included into Syria; (4) Hauran (Drusia, or Jabal ad Druz, capital Suweida); (5) Alexandria (Alexandrette; capital Alexandria, nowadays Iskenderun), which declared itself the independent Republic of Hatay (Sanjak d’Alexandrette) in 1938, however on 30 June 1939, this territory was annexed by Turkey and later included into the present-day province of Hatay with the capital of Antiochia (= Antakya). Modern Syria includes only the parts (1), (3) and (4) of this arrangement of the Union.

As a result, the term ‘Syria’ has been used at least in three different geographical meanings in the literature. For this reason, we include in our paper all notes on bat records assigned to ‘Syria’, although they might have come from outside the territory of modern Syria. Such cases where the location of the record is not clear are classified as possible records, see below. See also the definitions of the terms ‘Syria *sensu lato*’, ‘Syria *sensu stricto*’ and ‘Syria *proper*’ in the next paragraph.

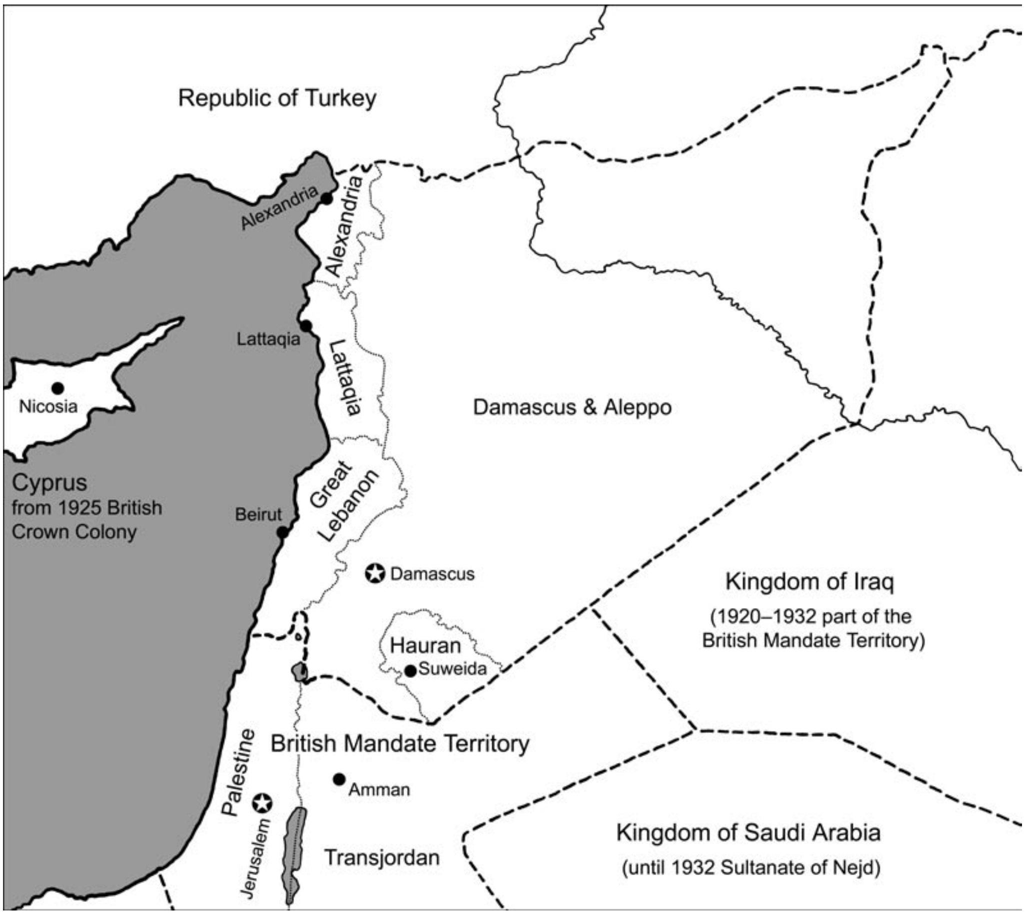

Fig. 4. Political partition of the territories of the former Ottoman Empire in the Eastern Mediterranean (i.e., Syria *sensu lato*) in 1923–1938, the first period of existence of the modern Syria (under French mandate rule); after Lehmann (1938).

Geographical terms used (in alphabetical order)

Anatolia – Asian part of Turkey, also Asia Minor;

Arabia – most of the Asian areas inhabited by Arabs; the territory south of Turkey and south and west of Iran, incl. Palestine, Hatay and Sinai;

Arava Valley [= Wadi Araba] – part of the Rift Valley from the Dead Sea to the Gulf of Aqaba, creating a border between Jordan and Palestine;

Asia Minor – Asian part of Turkey, also Anatolia;

Central Asia – the former Russian or Soviet Central Asia or Western Turkestan; nowadays, the area of Turkmenistan, Uzbekistan, Kirghizstan, Tajikistan, and southern Kazakhstan;

Holy Land – Palestine, western part of Jordan and southernmost part of Lebanon; a subunit of the Levant (see also Qumsiyeh 1996);

Hula Valley – part of the Rift Valley from the Lebanese border to the Lake of Kinneret (= Lake Tiberias, Sea of Galilee), creating a border between Syria *s.s.* (Golan Heights) and Palestine;

Jordan Valley – part of the Rift Valley from the Lake of Kinneret to the Dead Sea, creating a border between Jordan and Palestine;

Levant – a subunit of the Near East; comprising Cyprus, Sinai, Palestine, Lebanon, Syria *s.s.*, western Jordan, and southern Turkey (i.e. the Levant in the broader sense);

Mesopotamia – lowland territories of middle and lower parts of the Euphrates and Tigris river basins in southeastern Turkey, eastern Syria *s.s.*, Iraq, and southwestern Iran;

Middle East – region covering countries of the Arabian Peninsula, Cyprus, Asia Minor and Iran;

Near East – territory covering Asia Minor, Syria *s.s.*, Iraq, western Iran, Jordan, Lebanon and Palestine; a subunit of the Middle East;

Palestine – territory south of Lebanon and west of the Rift Valley (Jordan Valley, Dead Sea and the Arava Valley), and east of Sinai, at present covering Israel and the Palestinian territories or Palestine Autonomy;

Rift Valley (or Great Rift Valley) – longitudinal depression, approximately 6,000 km in length, which runs from Hatay in the Middle East via the Red Sea to Mozambique in East Africa, varying in width from thirty to one hundred kilometres, and in depth from a few hundred to several thousand metres; here this term is used only for its part from the Hula Valley to the Gulf of Aqaba, i.e., the eastern border of Palestine;

Syria *sensu lato* – Syria in the historical sense, a territory in northernmost Arabia between Asia Minor, Mesopotamia and Egypt; see above for the history of the modern use of the term Syria;

Syria *sensu stricto* – the territory of the present Syrian Arab Republic according to the international law, i.e. including the Golan Heights;

Syria *proper* – the territory ruled by the present Syrian Arab Republic, according to the *status quo* after the 1967 Six--days War;

Turkish Thrace – European part of Turkey.

Records

The lists of records (arranged in alphabetical and/or chronological orders) include, for each item, the following information: name of province (in spaced types), name of the locality (each record is primarilly listed by a name of nearest settlement) [in brackets, number of locality as indicated in the map], and/or description of record site, date, number of recorded bats with indication of their sex, age and physiological condition (for details see Abbreviations below). Transliteration of the geographic names from Arabic script to Latin follows the way used in *Jordan*, *Syria & Lebanon – Travel Atlas* (Lonely Planet & Steinhart Katzir Publishers, 1997).

Morphological analysis

For morphological comparisons, we used museum specimens which were examined in the same way as described in previous studies (e.g., Benda & Horáček 1995b, Benda & Tsytsulina 2000, Benda et al. 2004b, c). The specimens were measured in a standard way with the use of mechanical or optical callipers. Bacula were extracted in 4% solution of NaOH and coloured with alizarin red. The examined museum material is mentioned in the respective species chapters, the list of comparative material is given in Appendix II. For the evaluated external and cranial measurements, see Abbreviations. Statistical analyses were performed using the Statistica 6.0 software. Other methodological details or aspects are described in the chapters concerning taxonomic revisions of the respective species.

Diet analysis

In most instances, from bats sampled during the field studies, we collected a set of faecal pellets for further examination. From museum specimens, the digestive tract content was analysed. In most cases, we analysed at least 20 faecal pellets per sample. Where we did not succeed to collect 20 pellets, the number of pellets is mentioned. Pellets were disassembled in a Petri dish filled with water under a binocular microscope. Particular pieces of prey were identified to the order or family level and the percentage volume of prey categories was estimated for each pellet. The total volume of each diet item in a sample was counted as an average. Some prey fragments were stored for further, more accurate, identification after a discussion with specialists. Digestive tracts were dissected in a Petri dish filled with water and percentage of volume of particular prey categories was estimated for each one.

Sound recordings and analysis
Acoustic recordings were made using a portable ultrasound detector D240 (Pettersson Elektronik, Inc.) set on time-expansion mode connected to Sony WM-GX 550 stereo cassette recorder. The recordings were analysed with the software BatSound 1.2 (Pettersson Elektronik, Inc.). The sampling frequency of 22,050 samples/s, with 16 bits/sample was used. The only exception was *Aselia tridens*, in which the sampling frequency of 44,100 samples/s was used. A 512 pt. FFT with Hanning window was used for the analyses. The obtained frequency and time resolution for spectrograms and power spectra were 560 Hz and 0.3 ms, respectively. Oscilograms, power spectra and spectrograms were evaluated. For each echolocation call, the following parameters of the call were measured: total duration (D), start frequency (SF), end frequency (EF, both SF and EF at –30dB below the peak power spectral intensity), frequency of maximum energy (Fmax) and inter-pulse interval (IPI, the time between two consecutive calls). Only search phase calls were measured.

ABBREVIATIONS

Collection acronyms
AUB – American University Beirut, Lebanon; BMNH – Natural History Museum, London, United Kingdom; CUP – Department of Zoology, Charles University, Prague, Czech Republic; EBD – Biological Station Doñana, Seville, Spain; HSC – Hans M. Steiner private collection, Vienna, Austria; HUJ – Hebrew University, Jerusalem, Israel; ISEA – Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Krakow, Poland; IVB – Institute of Vertebrate Biology, Academy of Sciences of the Czech Republic, Brno, Czech Republic; JGUM – Department of Ecology, Johannes Guttenberg University, Main, Germany; JOC – Ján Obuch private collection, Blatnica, Slovakia; MHNG – Natural History Museum, Geneva, Switzerland; MNHN – National Museum of Natural History, Paris, France; MUB – Department of Zoology, Masaryk University, Brno, Czech Republic; NMNHS – National Museum of Natural History, Sofia, Bulgaria; NMP – National Museum (Natural History), Prague, Czech Republic; NMW – Natural History Museum, Vienna, Austria; OHC – Otto von Helversen private collection, Erlangen, Germany; RLC – Radek Lučan private collection, České Budějovice, Czech Republic; RMHR – Regional Museum Ruse, Bulgaria; SNM – Slovak National Museum, Bratislava, Slovakia; SMF – Senckenberg Museum and Research Institute, Frankfurt am Mein, Germany; SMO – Silesian Provincial Museum, Opava, Czech Republic; SMZ – South Moravian Museum in Znojmo, Czech Republic; TAU – Tel Aviv University, Tel Aviv, Israel; VMO – Regional Museum, Olomouc, Czech Republic; VSMK – East Slovakian Museum, Košice, Slovakia; WBM – West Bohemian Museum, Plzeň, Czech Republic; WIC – Willi Issel private collection, Augsburg, Germany; ZDNU – Department of Zoology, Niğde University, Niğde, Turkey; ZFMK – Zoological Institute and Museum Alexander Koenig, Bonn, Germany; ZIE – Zoological Institute, Armenian Academy of Sciences, Erevan, Armenia; ZIN – Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia; ZMB – Zoological Museum, Humboldt University, Berlin, Germany; ZMMU – Zoological Museum of Moscow State University, Moscow, Russia; ZZZ – Zoological Institute, Zagreb, Croatia.

Measurements
External measurements. LC = head and body length; LCd = tail length; LAt = forearm length; LPol = thumb length; LA = auricle length; LTr = tragus length; LaFE = horseshoe width; G = body weight; III.D1 = length of the proximal phalanx of the third wing finger; III.D2 = length of the medial phalanx of the third wing finger; IV.D1 = length of the proximal phalanx of the fourth wing finger; IV.D2 = length of the medial phalanx of the fourth wing finger; V.D1 = length of the proximal phalanx of the fifth wing finger; V.D2 = length of the medial phalanx of the fifth wing finger; IV.FR = ratio of the proximal and medial phalangi lengths of the fourth wing finger (also as FR only); V.FR = ratio of the proximal and medial phalangi lengths of the fifth wing finger.

Cranial & dental measurements. LCr = greatest length of skull (incl. the praemaxillae in Rhinolophidae and Hipposideridae); LCb = condylobasal length of skull; LCc = condylocanine length of skull; LaZ = zygomatic width; LaI = width of interorbital constriction; LaP = width of postorbital constriction; LaInf = ifraorbital witdth; LaN = neurocranium width; LaM = mastoidal width; AN = neurocranium height; ACr = skull height; CC = rostral width between canines (incl.); P^4P^4 = rostral width between largest upper premolars (incl.); M^2M^2 = rostral width between second upper molars (incl.); M^3M^3 = rostral width between third upper molars (incl.); IM^3 = length of upper tooth-row between I^1M^3 (incl.); CM^2 = length of upper tooth-row between CM^2 (incl.); CM^3 = length of upper tooth-row between CM^3 (incl.); P^4M^3 = length of upper tooth-row between P^4M^3 (incl.); M^1M^3 = length of upper tooth-row between M^1M^3 (incl.); LMd = condylar length of mandible; ACo = height of coronoid process; IM_3 = length of upper tooth-row between I_1M_3 (incl.); CM_3 = length of lower tooth-row between CM_3 (incl.); P_4M_3 = length of upper tooth-row between P_4M_3 (incl.); M_1M_3 = length of upper tooth-row between M_1M_3 (incl.); LBT = largest horisontal length of tympanic bulla; PR = premolar ratio (for details see text); ACn = height of the mesiopalatal cingular cusp of P^4; RCn = relative width of the upper canine (mesidistal length : palatolabial width).

Other abbreviations
a = adult; A = alcoholic preparation; B = skin (balg); coll. = collected; det. = detected by a bat detector; f = female; G = pregnant; j = juvenile; m = male; M = mean; max., min. = range margins; net. = netted; obs. = observed; s = subadult; S = skull; SD = standard deviation, Sk = skeleton.

LIST OF SPECIES

Rousettus aegyptiacus (Geoffroy, 1810)

Records. **Original data**: Der'a: Talsh'hab [1], waterfall in the Al Yarmuk Valley, 25 May 2001: net. 1 ma, 1 faL, 1 fj. – Homs: Qala'at al Hosn [2], ruins of Krak des Chevaliers, under a castle bridge, 10 May 2001: net. 1 fa, obs. min. 2 flying inds.; 18 October 2004: net. 1 fs. – Quneitra / Golan Heights: Ya'ar Oden forest [3], above a water pit in an apple orchard, 18 July 1999: net. 1 ma, 1 fa. – **Published data**: Idlib: Al Manfa Cave [4], 3 km E of Hamama (= Hammam), 5, 6 and 18 July 2004, 6 September 2004, and 11 October 2004: colony of 1000–1500 inds. (coll. 56 inds.) (Shehab & Mamkhair 2004). – Quneitra / Golan Heights: Al Watta Cave on Mt. Hermon near Baniyas [5], dozens of inds. (Frumkin 1988).

Possible records (Syria *sensu lato*). **Published data**: Syrien (Fitzinger 1869). – Syria, 1 m, coll. Verreaux (de Seabra 1898).

Distribution. **General**. *Rousettus aegyptiacus* is mostly an Afro-tropical species, which marginally reaches the southwestern part of the Palaearctic (Juste & Ibañez 1993, Bergmans 1994, Kwiecinski & Griffiths 1999). In the sub-Saharan Africa, it occupies areas around the Gulf of Guinea from Senegal to western Angola (including some islands in the Gulf), and savanna regions of South and East Africa from the Cape to Eritrea. In the Palaearctic, *R. aegyptiacus* occurs in Egypt as well as in broad coastal areas of the Middle East from southwestern Turkey and Cyprus along the shore of the Arabian Peninsula up to southern Iran and Pakistan.

Near East. *R. aegyptiacus* occurs in the Levant, including Turkey, Syria, Lebanon, Palestine, Jordan, and Cyprus (Kock & Nader 1979, Harrison & Bates 1991, Bergmans 1994). In the Near East, this bat reaches northern margin of its distribution range. This species does not inhabit the territory of Iraq, the mention of 'S Iraq' in its distribution range by Horáček et al. (2000) is erroneous; the species has not been recorded in the whole Mesopotamia yet (Harrison & Bates 1991, Bergmans 1994, Kwiecinski & Griffiths 1999).

R. aegyptiacus reaches northernmost margin of its distribution range in Turkey (Benda & Horáček 1998), where it was recorded along the Levantine coast from Lycia to Hatay in southern Anatolia (Corbet & Morris 1967, Kinzelbach 1986, Albayrak 1993a, von Bülow 1997, Benda & Horáček 1998, Karataş et al. 2003b); however, majority of Turkish records of this bat come from Cilicia and Hatay (Şadoğlu 1953, Kosswig 1955, Eisentraut 1959, Kahmann & Çağlar 1960, von Lehmann 1966, Kumerloeve 1975a, Spitzenberger 1979, Albayrak 1990a, 1993a, Aktaş & Hasbenli 1994, Benda & Horáček 1998, Karataş et al. 2003b, Karataş & Sachanowicz in press).

In Lebanon, *R. aegyptiacus* is distributed throughout the Levantine coast (Tristram 1884, Festa 1894, Eisentraut 1959, Lewis & Harrison 1962, Harrison 1964a, 1972, Atallah 1970, 1977, Kumerloeve 1975b, Tohmé & Tohmé 1985, Nadachowski et al. 1990, Bergmans 1994, our unpubl. data), the only possible inland record comes from the Mt. Lebanon (Andersen 1912). The largest number of *R. aegyptiacus* records in the Near East is known from Palestine. Most findings have been made in the Mediterranean parts of the country; the species has been recorded in the Coastal Plains, Judean Hills and in the Jordan and Hula Valleys (Tristram 1866, 1884, Bodenheimer 1935, 1958, Dor 1947, Harrison 1964a, Theodor 1967, Kock 1969, Atallah 1977, Qumsiyeh 1985, Nadachowski et al. 1990, Harrison & Bates 1991, Bergmans 1994, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Ferguson 2002, our unpubl. data). However, in the last years it has been recorded also in desert areas of the Arava Valley and Negev (Mendelssohn & Yom-Tov 1999, Ferguson 2002). Also in Jordan, this species was found in the Rift Valley and its tributaries, both to the north

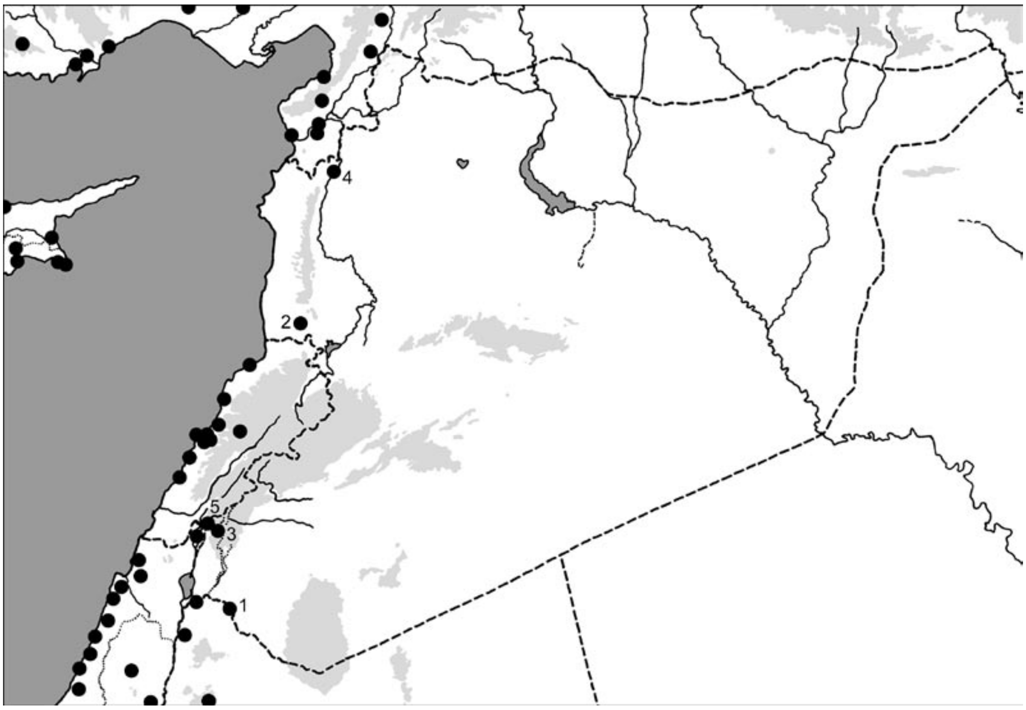

Fig. 5. Records of *Rousettus aegyptiacus* (Geoffroy, 1810) in Syria and surrounding areas.

and south of the Dead Sea (Kock & Nader 1979, Qumsiyeh 1980, 1996, Qumsiyeh et al. 1986, Benda & Sádlová 1999, Al-Omari et al. 2000, Amr 2000, Amr et al. 1987, 2004).

Numerous records of *R. aegyptiacus* are known from Cyprus (Unger & Kotschy 1865, Günther 1879, Matschie 1899, Bate 1903, Andersen 1912, Theodor 1954a, Kock 1978, Spitzenberger 1979, Boye et al. 1990, our unpubl. data).

Syria (Fig. 5). *R. aegyptiacus* is a rather rare bat in Syria, only five records are available (Table 1). The confirmed records of this bat come from different regions of the Mediterranean part of the country. The most of Syrian records is connected with the species range in the Jordan and Hula Valleys, where the species is relatively common (Bodenheimer 1958, Mendelssohn & Yom-Tov 1999), i.e. in the Golan Heights and the Al Yarmuk Valley [1, 3, 5]. In the valley of the Al Yarmuk River this bat was recorded already by Qumsiyeh et al. (1986) in an unnamed cave near El Hamma in Jordan, where a colony of at least 3000 individuals was found. The recent finding of a huge colony in the Orontes Valley [4] by Shehab & Mamkhair (2004) is the first published record of *R. aegyptiacus* from Syria *proper*. However, this finding is not too surprising, since this species was repeatedly recorded in Turkish Hatay (Benda & Horáček 1998). Our new record from the southern part of the Jebel An Nusariyah Mts [2] supports a continuity of the range along the western slopes of the Lebanon Mts suggested by numerous records (see above).

No records come from the Syrian shore of the Mediterranean Sea, although both in Lebanon and Turkey the centres of distribution are related to sea shore. The Syrian part of the Levantine shore represents an apparent gap in a more or less continuous occurrence along the whole Levantine shore from southwestern Turkey to the Nile Delta, incl. Cyprus (Bergmans 1994, Benda

& Horáček 1998). Presumably, in the cultivated areas along the Mediterranean Sea as well as along the Orontes Valley, records of *R. aegyptiacus* can be expected. Similarly, another area of distribution of this species in Syria may possible be found in the northwestern tip of the country between the rivers of Afrin and Karasu. In this region, at least two significant records were made on the Turkish side; near Hassa – a colony of 1000–1500 inds. (Karataş et al. 2003b), Demrek near Islahiye – a colony of about 1000 inds. (Karataş & Sachanowicz in press).

Syria has been considered by several authors as a part of distribution range of *R. aegyptiacus*; e.g., Syrien (Fitzinger 1869); Syria (Günther 1879); Northern Syria (Tristram 1884); Syria (de Seabra 1898); Syrien (Matschie 1899); Syria (Anderson 1902); Syria (Andersen 1907a, 1912); Syria (Ellerman & Morrison-Scott 1951); Suriye (Şadoğlu 1953); Syria (Theodor 1954a); Syria (Bodenheimer 1958); nördliche Küstenregion Syriens (Eisentraut 1959); Syria (Hayman & Hill 1971); Syria (Gaisler et al. 1972); Syria (Atallah 1977); western Syria (Kwiecinski & Griffiths 1999); and probably some others. However, these data largely consider Syria in its broader sense and most probably, the actual records are likely to come from the present territory of Lebanon or Palestine and/or from Turkey (see e.g. Bergmans 1994). Harrison (1964a) and Harrison & Bates (1991) did not mention Syrian area as a part of distribution range of *R. aegyptiacus* in Arabia. The mention of 'S Syria' by Horáček et al. (2000) represents our record from the Golan Heights [3] preliminary reported by Benda et al. (1999a).

Kock (1969) depicted a comprehensive review of distribution of *R. aegyptiacus* in the Levant and added: "Aus diesen bisher gennanten Funden war auf das Vorkommen in Syrien zu schließen. Matschie (1899) und Andersen (1907a) nennen Syrien als Teil des Verbreitungsgebietes, führen aber keine Belegexemplare auf. Im SMF befindet sich ein Exemplar vom Zerka-Fluß [...] als sicherer Nachweis für dieses Gebiet." However, the Zerqa River or Wadi Zarqa lies in the territory of the present-day Jordan, on the eastern bank of the Dead Sea [31° 36' N, 35° 38' E; sensu Qumsiyeh 1996] as Kock & Nader (1979) pointed out already. The problem of the former reports of Syria as a part of *R. aegyptiacus* range was also broadly commented by Bergmans (1994): "Fitzinger (1879) recorded that Th. Kotschy discovered the species in Syria. The origin of his material (neither in the NMW, nor located elsewhere yet) or observations is most probably Beirut, or somewhere near it, in present-day Lebanon (Dr F. Spitzenberger, in lit. [...]). Seabra (1898) recorded a specimen from Syria [...]. Both Matschie (1899) and Andersen (1912) referred to the latter record (and Andersen also to the former) [...]. Kock [1969] published a record from Zerqa River, Syria [...]. Later, Kock [& Nader] (1979) discovered that this specimen is not from Syria but from Jordan. Jordan has a Zerqua or Zarqa River [...] and the species' occurrence there is perfectly likely. The problem with the Syrian records is their age. The name 'Syria' covered a different region then from that which it does now [...]. Nevertheless, *Rousettus* may still be discovered in the Mediterranean section of present-day Syria (but probably not at the Ouadi Zergane or Zarqua Suyu River in that country, at 40° 22' E, 36° 55' N – my initial identification of Zerka River)."

FIELD NOTES. *Rousettus aegyptiacus* was in Syria recorded by netting above a small lake below a waterfall in the Al Yarmuk Valley at Talsh'hab (Fig. 6) and above an irrigation reservoir in an apple plantation at Ya'ar Oden (Fig. 7). This species was netted twice at Qala'at al Hosn, under a bridge span of Krak des Chevaliers (10 May 2001, 18 October 2004), over a moat free of water (Fig. 8). Only caves have been reported as roosts of *R. aegyptiacus* in Syria: the Al Watta Cave above the fertile Hula Valley hosting dozens of individuals (Frumkin 1988) and the Al Manfa Cave, a large cave located on the western side of a cliff above the Orontes Valley occupied by a colony of 1000–1500 individuals (Shehab & Mamkhair 2004). Although Mendelssohn & Yom-Tov (1999) mentioned "wells and ruins and even inhabited buildings" as the roosts used by *R. aegyptiacus* in Palestine, and similar roost types were reported also from Egypt (Qumsiyeh 1985), such shelters are not known from Syria. Shehab & Mamkhair (2004: 73–74) described in details the Al-Manfa Cave used as a roost of *R. aegyptiacus*: “the entrance is about 2.5 m high and 2 m wide, and then deep inside it becomes wider and higher. About 15 m from the entrance, the cave turns left, its height rises to about 5 m, and it extends more than 60 m, ending in a narrow opening of 0.5 m in diameter that in turn leads to a large hall; then a curved narrow tunnel of about 15 m leads to a narrow exit of 0.5 m. It is completely dark, with no visible light. [...] Bats were roosting in clusters of hundreds right up to the roof. Most of the bats were roosting close to the entrance, where it was to hear their noisy chatter.”

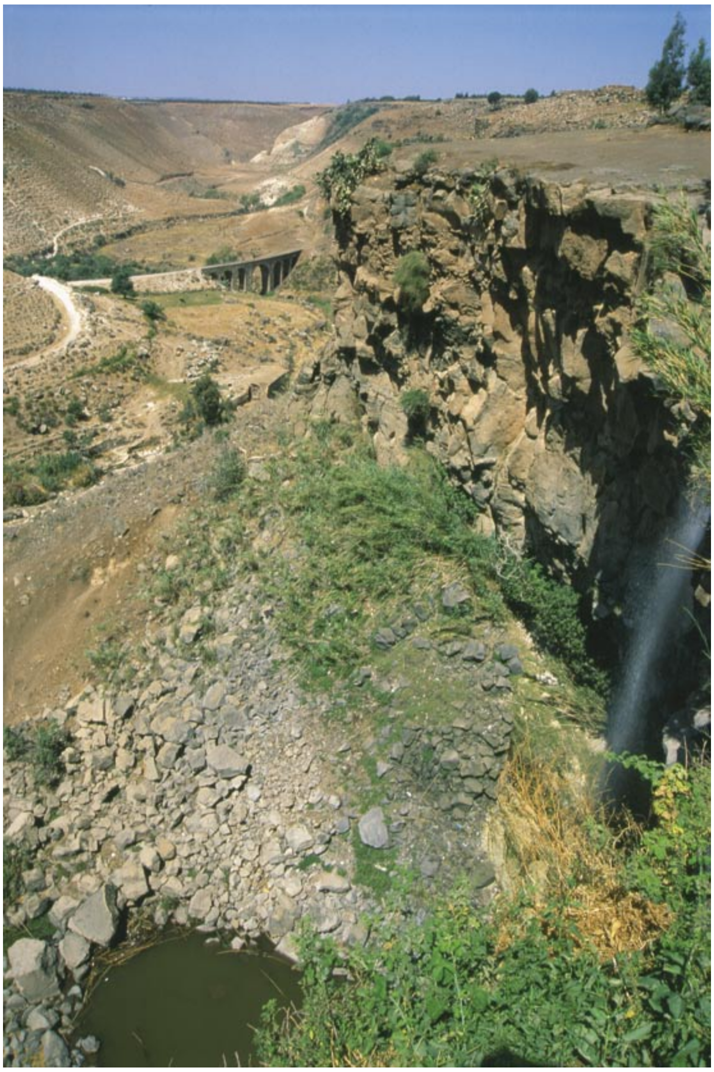

Fig. 6. Upper part of the Al Yarmuk Valley at Talsh’hab, netting site of *Rousettus aegyptiacus*, *Myotis nattereri*, *Pipistrellus kuhlii*, and *Miniopterus schreibersii* (photo by A. Reiter).

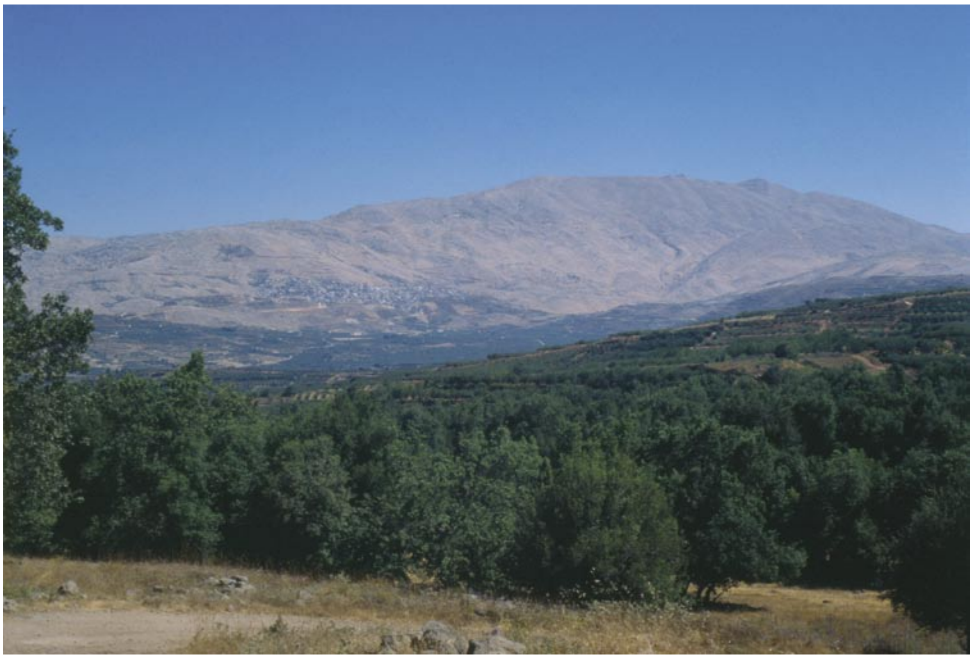

Fig. 7. Ya'ar Oden forest, Golan Heights (with Mount Hermon in the background). The area where *Rousettus aegyptiacus*, *Eptesicus serotinus* and *Pipistrellus kuhlii* were recorded (photo by P. Benda).

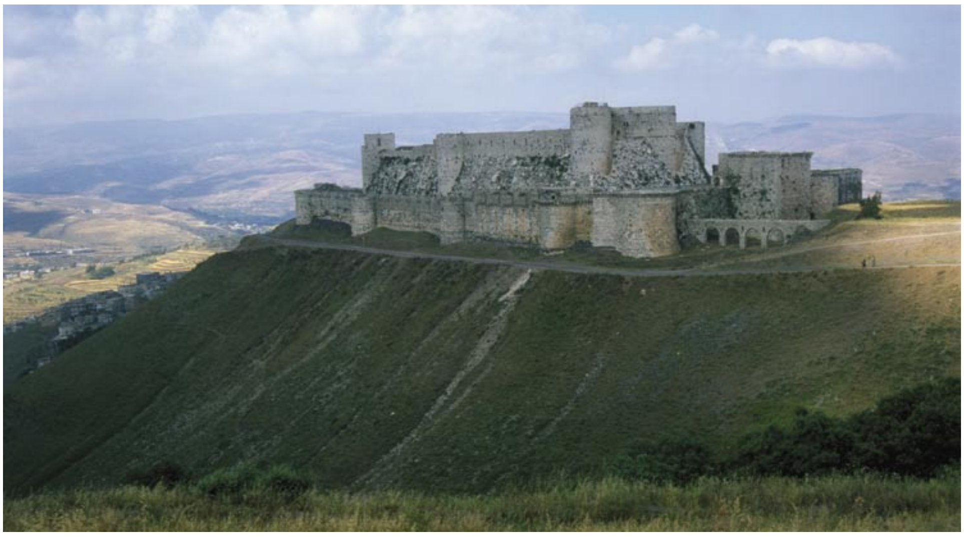

Fig. 8. Largest, best preserved and most famous Syrian crusader castle, Krak des Chevaliers. In and around these ruins, nine bat species were recorded: *Rousettus aegyptiacus*, *Rhinolophus ferrumequinum*, *R. hipposideros*, *Myotis myotis*, *M. blythii*, *Pipistrellus pipistrellus*, *P. kuhlii*, *Miniopterus schreibersii*, and *Tadarida teniotis*; note the stone bridge above the dry moat (right), under which spans, *R. aegyptiacus*, *P. kuhlii* and *M. schreibersii* were netted (photo by A. Reiter).

R. aegyptiacus was found to be an exclusive component of the Mediterranean bat community in Syria. In the Ya'ar Oden forest, calls of *P. kuhlii* and *E. serotinus* were recorded syntopically together with the caught individuals of *R. aegyptiacus* (Fig. 9). At Talsh'hab, besides *R. aegyptiacus* also *M. nattereri*, *P. kuhlii* and *M. schreibersii* were netted and a call of *T. teniotis* was recorded. At Qala'at al Hosn, a rich community composed of *R. ferrumequinum*, *R. hipposideros*, *M. myotis*, *P. pipistrellus*, *P. kuhlii*, *M. schreibersii*, and *T. teniotis*, was documented during repeated visits. On the other hand, the only roost of *R. aegyptiacus* known in Syria *proper* was found by Shehab & Mamkhair (2004) to be used only by this species.

We have not recorded any signs of reproduction of *R. aegyptiacus* in Syria, except for a lactating female and a full-grown juvenile netted at Talsh'hab on 25 May 2001. However, Shehab & Mamkhair (2004) visited the Al Manfa Cave three times during 2004 and concluded: "Newborns were with closed eyes, folded ears (12.3 mm), [LAt] = 35 mm [...]. A developed suckling infant [...] [LAt] = 78 mm [...] was captured on 6th of September attached firmly to the mother's body.

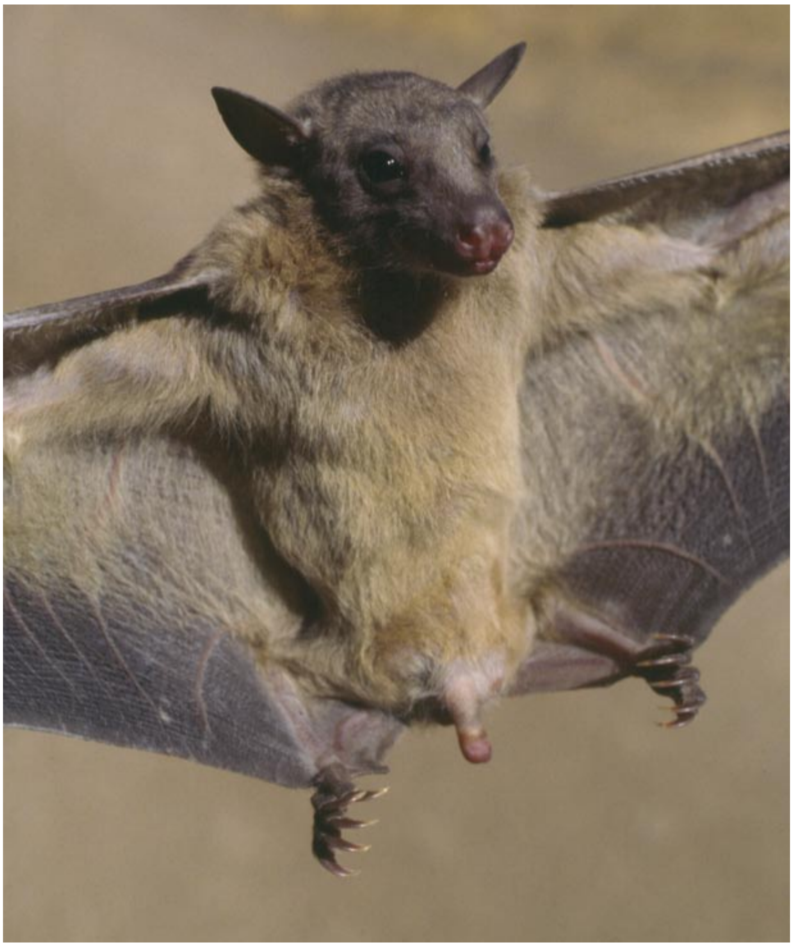

Fig. 9. Male of *Rousettus aegyptiacus* (Geoffroy, 1810) from the Ya'ar Oden forest, Golan Heights (photo by P. Benda).

Table 2. Basic biometric data on examined Syrian and comparative samples of *Rousettus aegyptiacus* (Geoffroy, 1810). For abbreviations see pp. 10, 11

	Syria (our data)					Syria (Shahab & Mamkhair 2004)					Levant (other than Syria)				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	4	**94.20**	92.7	97.5	2.242	30	**92.69**	87.0	98.0	–	3	**93.03**	90.0	96.3	3.156
LCr	4	**43.38**	42.43	44.18	0.727	15	**42.89**	40.94	44.54	–	6	**43.16**	40.68	45.19	1.731
LCb	4	**41.55**	40.75	42.50	0.748	13	**40.98**	39.00	43.22	–	6	**41.50**	39.24	43.57	1.536
LaZ	4	**26.39**	25.77	27.02	0.511	12	**25.64**	23.90	28.16	–	6	**26.79**	24.63	28.74	1.378
LaI	4	**8.47**	8.37	8.57	0.090	16	**8.19**	7.46	9.52	–	5	**8.28**	7.93	8.62	0.295
LaP	4	**7.70**	7.22	8.76	0.718	–	–	–	–	–	5	**7.94**	7.55	8.61	0.423
LaN	4	**17.15**	16.84	17.42	0.264	13	**16.69**	15.82	17.70	–	6	**17.20**	16.83	17.93	0.379
ANc	4	**13.01**	12.55	13.72	0.502	–	–	–	–	–	6	**12.88**	11.64	13.43	0.639
CC	4	**8.66**	8.43	8.93	0.250	–	–	–	–	–	5	**8.79**	8.53	9.33	0.331
M^2M^2	4	**12.90**	12.29	13.37	0.490	–	–	–	–	–	5	**12.96**	12.54	13.50	0.426
CM^2	4	**16.43**	15.56	17.62	0.864	16	**16.53**	15.72	17.66	–	6	**16.59**	16.02	17.44	0.535
LMd	4	**33.83**	33.55	34.58	0.501	16	**33.74**	32.00	34.92	–	6	**33.67**	31.98	35.19	1.329
ACo	3	**14.85**	14.49	15.03	0.309	–	–	–	–	–	6	**14.75**	13.27	16.34	1.075
CM_3	4	**18.25**	17.75	19.20	0.650	16	**18.02**	17.00	18.84	–	5	**18.19**	17.56	18.57	0.451

	Lower Egypt & Dakhla					Yemen					Iran				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	23	**92.15**	86.6	96.2	2.974	19	**90.10**	85.2	94.8	2.553	19	**88.42**	81.5	92.9	2.973
LCr	34	**44.02**	41.47	46.11	1.222	14	**40.75**	39.27	42.74	1.014	14	**39.72**	38.00	41.62	1.135
LCb	33	**42.47**	39.64	44.68	1.231	14	**39.11**	37.69	40.73	1.029	14	**38.16**	36.14	40.07	1.219
LaZ	33	**26.63**	24.23	29.27	1.171	14	**24.57**	23.13	26.57	0.976	14	**24.49**	23.42	26.42	0.932
LaI	14	**8.39**	7.73	9.23	0.440	14	**7.66**	7.06	8.16	0.298	14	**7.71**	7.37	8.37	0.275
LaP	14	**8.14**	7.28	8.87	0.499	14	**7.32**	6.63	8.32	0.449	14	**7.76**	6.97	8.98	0.505
LaN	33	**17.39**	16.82	18.12	0.387	14	**16.33**	15.58	17.02	0.502	14	**16.41**	15.74	17.19	0.455
ANc	34	**13.18**	12.31	14.28	0.561	14	**12.37**	11.90	13.08	0.366	14	**12.21**	11.61	13.23	0.438
CC	33	**8.77**	8.21	9.64	0.416	14	**8.13**	7.82	8.62	0.224	14	**8.12**	7.68	8.93	0.376
M^2M^2	33	**13.31**	12.35	14.08	0.449	13	**12.16**	11.65	12.74	0.310	14	**12.04**	11.34	12.69	0.418
CM^2	34	**16.75**	15.58	18.04	0.531	14	**15.73**	14.92	16.74	0.475	14	**15.39**	14.30	16.21	0.627
LMd	34	**34.25**	31.97	36.02	0.969	14	**31.51**	30.12	33.02	0.759	14	**31.13**	29.68	32.89	1.032
ACo	34	**15.85**	14.54	17.27	0.722	14	**14.08**	13.14	15.02	0.581	14	**13.47**	12.38	14.36	0.645
CM_3	33	**18.22**	17.08	19.57	0.569	14	**17.23**	16.54	18.23	0.504	14	**16.76**	15.75	17.60	0.618

[...]. The proportion of females was 66.6%, 60% and 60% of the total number of captured specimens on 6 July, 6 September and 11 October, respectively. The percentage for both pregnant and lactating females combined out of the total number of adult females was 62.3% in July; increasing to 83.3% in September, while it was 66.7% in October 2004."

Although *R. aegyptiacus* has been found in the diet of owls in several countries of the Middle East (Bonhote 1909, Dor 1947, Qumsiyeh 1985, Benda & Horáček 1998, Obuch unpubl.), it was not proved in the analysed samples of owl pellets from Syria.

MATERIAL EXAMINED. 1 ma, 1 fa, 1 fj (NMP 48865–48867 [S+A]), Talsh'hab, 25 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma, 1 fa (NMP 48264, 48265 [S+A]), Ya'ar Oden forest, 18 July 1999, leg. P. Benda.

MORPHOLOGY. See Table 2 and Appendix III for biometric data on the Syrian specimens of *Rousettus aegyptiacus*.

TAXONOMY. *Rousettus aegyptiacus** is a polytypic species, four subspecies are recognised within its continental Afro-Asian range (Eisentraut 1959, Hayman & Hill 1971, Bergmans 1994, Koopman

1994, Kwiecinski & Griffiths 1999, Simmons 2005); viz. *R. a. aegyptiacus* (Geoffroy, 1810) (terra typica: la grande pyramide [= the Great Pyramid, Giza, Cairo, Egypt]), *R. a. leachii* (Smith, 1829) (t.t.: Cape [South Africa]), *R. a. unicolor* (Gray, 1870) (t.t.: Gaboon [= Gabon]), and *R. a. arabicus* Anderson, 1902 (t.t.: Aden [Yemen]). Juste & Ibañez (1993) described two more subspecies from the islands of the Gulf of Guinea, Africa, viz. *R. a. princeps* (t.t.: Roça Bela Vista, near Santo Antonio de Principe, Principe island) and *R. a. tomensis* (t.t.: Bindá, São Tomé island).

Two subspecies occur in the Middle East (Eisentraut 1959, Harrison 1964a, Hayman & Hill 1971, Corbet 1978, Harrison & Bates 1991, Bergmans 1994, Koopman 1994, Kwiecinski & Griffiths 1999, Horáček et al. 2000): the larger form, *R. a. aegyptiacus*, in the Levant[†] and the smaller one, *R. a. arabicus*, in southern and southeastern Arabia and southern Iran. The Syrian territory lies within the Levantine part of the distribution range of the nominotypical subspecies, comprising also Cyprus, southern Turkey, Lebanon, Palestine, western Jordan and Egypt (Anderson 1902, Andersen 1907a, Ellerman & Morrison-Scott 1951, Harrison 1956c, 1964a, Eisentraut 1959, Kahmann & Çağlar 1960, Hoogstraal 1962, Kock 1969, Hayman & Hill 1971, Gaisler et al. 1972, Koopman 1975, Atallah 1977, Corbet 1978, Spitzenberger 1979, Qumsiyeh 1980, 1985, Nadachowski et al. 1990, Churcher 1991, Harrison & Bates 1991, Bergmans 1994, Kwiecinski & Griffiths 1999, Mendelssohn & Yom-Tov 1999, Karataş et al. 2003b, etc.). Based on this geographic proximity as well as on metric characters (Table 2), which mostly concur with Egyptian and other Levantine samples but are larger than those of southern Arabia and Iran, the Syrian fruit-bats undoubtedly belong to *R. a. aegyptiacus*. This non-surprising conclusion was reported already by Shehab & Mamkhair (2004) who, however, compared only literature data.

Rhinopoma microphyllum (Brünnich, 1782)

Records. **Published data**: Golan Heights, two unidentified records mapped in central and southern parts of this region [roughly the areas of Katsrin and Ramot] (Mendelssohn & Yom-Tov 1999).

Distribution. **General**. *Rhinopoma microphyllum* is a Saharo-Sindian species which inhabits arid and semi-arid parts of North Africa, the Middle East, and southern Asia, an isolated population was found in northern Sumatra (Hill 1977, Van Cakenberghe & De Vree 1994, Schlitter & Qumsiyeh 1996). The African range comprises Saharan countries from Senegal, Mauritania, and Morocco to Nigeria, Sudan and Egypt. In continental Asia, this bat occurs from Lebanon, Palestine and Saudi Arabia to Afghanistan, Pakistan and southern India.

Near East. In the Near East, *R. microphyllum* commonly occurs mainly along the Rift Valley, including Lebanon, Syria, Palestine, and Jordan (Nader & Kock 1983b, Harrison & Bates 1991), it has been recently also reported from Middle Mesopotamia (Khajuria 1988, Kock et al. 2001). In the Lower Mesopotamia of the present-day Iran, this bat has been also recorded (Cheesman 1921, Lay 1967, Etemad 1969, Schlitter & DeBlase 1974, DeBlase 1980, Sharifi & Hemmati 2002). Some older records, mainly from the Holy Land, might be, however, confused with those of *R. hardwickii*, and therefore only re-identified museum specimens and/or recently published records can be considered as correctly determined ones (see Thomas 1903, Harrison 1964a, Qumsiyeh 1996, etc.).

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* The name quatation in accordance with the opinion by Kock (2001a).

[†] Note. Nader (1975) reported *R. a. aegyptiacus* from southwestern Saudi Arabia and Anciaux de Faveaux (1978) mentioned this form (partim) probably in error from Aden, Yemen. The former identification was accepted by Harrison & Bates (1991) but both opinions were refused by Bergmans (1994), who considered the Saudi Arabian and Yemeni populations to be parts of *R. a. arabicus*. On the other hand, Ferguson (2002) who generally reported *R. a. aegyptiacus* from Palestine, added: "In Eilat [= southernmost Palestine], it [= *R. aegyptiacus*] probably represents the Arabian subspecies, *R. aegyptiacus arabicus* Anderson and de Winton, 1902, which is usually smaller, with a more pointed ear tip." However, he did not support such opinion with any data comparison and/or measurements presentation.

‡ Note. Hasselquist (1757, 1762) described only one bat species *Vespertilio ægyptiacus*, which could be identical with the current species *Rhinopoma microphyllum* according to the description given (but most probably with any other small bat

R. microphyllum was only once found in southern Lebanon, in a cave in the Litani Valley (Harrison 1963a). In Palestine, it occurs mainly in the Jordan and Hula Valleys and along the shore of the Dead Sea (Tristram 1866, 1884, Anderson 1902, Aharoni 1930, Bodenheimer 1935, Jobling 1952, Harrison 1963a, 1964a, Kock 1969, Qumsiyeh 1985, 1996, Makin 1977, 1987, Shalmon 1989, Harrison & Bates 1991, Yom-Tov et al. 1992a, Mendelssohn & Yom-Tov 1999); but some records come also from Mediterranean parts of northern Palestine (Judean Hills, Coastal Plains) (Dor 1947, Bodenheimer 1958, Harrison 1963a, 1964a, Kock 1969, Makin 1977, Qumsiyeh 1985, 1996, Shalmon 1989, Mendelssohn & Yom-Tov 1999). Several recent records have been reported also from the southern part of the Arava Valley (Makin 1979, Shalmon 1989, Mendelssohn & Yom-Tov 1999) and from the Negev Desert (Korine & Pinshow 2004). In Jordan, this species has been found only in the northwestern part of the country adjacent to the Jordan Valley (Tristram 1884, Qumsiyeh & Baker 1985, Qumsiyeh 1996, Benda & Sádlová 1999).

The only records of *R. microphyllum* from Iraq were published by Khajuria (1988) who reported occurrence of this species from the Haditha region. He also described a new species, *Rhinopoma hadithaensis*, whose holotype specimen came from the Al-Fassayah cavern about 20 km from Haditha. Kock et al. (2001) have later identified this specimen as of *R. microphyllum* according to the description and measurements given by Khajuria (1988).

Syria (Fig. 10). *R. microphyllum* is the rarest bat in Syria (Table 1). The only certain records of *R. microphyllum* from Syria were indicated by Mendelssohn & Yom-Tov (1999), however they just marked two dots in their distribution map and mentioned ‘southern Golan Heights’ in the general description of the species’ Israeli distribution. However, these records are quite new, because neither Atallah (1977), Harrison & Bates (1991) nor Qumsiyeh (1996) mentioned any *Rhinopoma* species from the Syrian territory, including the Golan Heights.

Nevertheless, some older records migth indicate occurrence of *R. microphyllum* in southwestern Syria, such as ‘cave near Tiberias’ (Theodor & Moscona 1954), ‘Tiberias’ (Jobling 1952, Nader & Kock 1983b, Qumsiyeh 1985) or ‘Kinereth’ (Harrison 1963a, 1964a, Qumsiyeh 1985), where the geographical names would denote towns or a lake. The towns of Tiberias and Kinneret lie on the Palestinian side of the Rift Valley, however the Lake of Kinneret (= Lake Tiberias, Sea of Galilee) lies on the border between Palestine and Syria. If the above mentioned names denoted a lake, the findings might originate in Syria *sensu stricto*. Anyway, the western slopes of the Golan Heights are inhabited by *R. microphyllum* as pointed out by Mendelssohn & Yom-Tov (1999) and as the records from the Hula Valley (Dan, Buzieh) indicate (Harrison 1963a, 1964a). However, this species could be also found in the Syrian part of the Euphrates Valley where these possible findings may connect the isolated records in western Iraq made by Khajuria (1988).

TAXONOMY. *Rhinopoma microphyllum* is considered to be a polytypic species, four to six subspecies are recognised in its whole distribution range (Kock 1969, Hill 1977, Koopman 1994, Van Cakenberghe & De Vree 1994, Horáček et al. 2000, Simmons 2005); viz. *R. m. microphyllum* (Brünnich, 1782) (terra typica: primarily ‘Arabien: Aegyptiske Pyramider’ [= Egyptian pyramids, Egypt], restricted to ‘one of the small Pyramids of Gizeh, Egypt’ by Anderson 1902 sensu Hasselquist‡); *R. m. sumatrae* Thomas, 1903 (t.t.: Balighe, Lake Toba, NW Sumatra); *R. m. kinneari* Wroughton, 1912 (t.t.: Bhuj, Cutch, India); *R. m. tropicalis* Kock, 1969 (t.t.: Jebel Talao, near Kadugli, Kordofan, Sudan); *R. m. harrisoni* Schlitter et DeBlase, 1974 (t.t.: 10 km SE of Kazerun, Fars, Iran); and *R. m. asirensis* Nader et Kock, 1983 (t.t.: Al Jowa, ca. 37 km E of Abu Arish, SW Saudi Arabia).

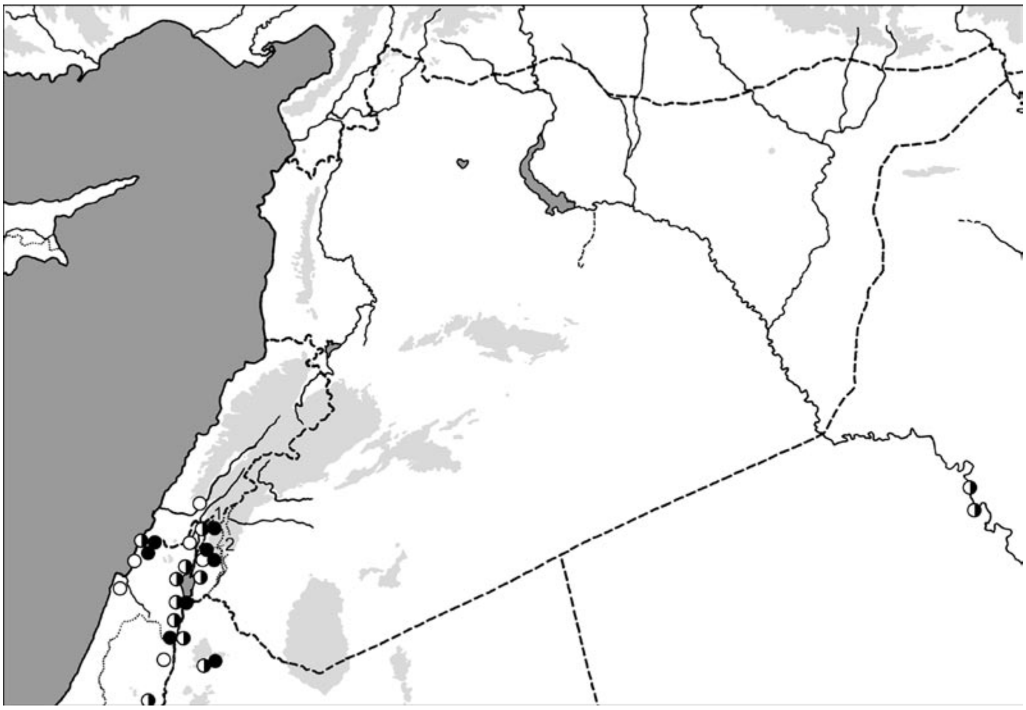

Fig. 10. Records of *Rhinopoma microphyllum* (Brünnich, 1782) (open symbols) and *R. hardwickii* Gray, 1831 (closed symbols) in Syria and surrounding areas.

In elder synopses (e.g. Dobson 1876, 1878), *R. microphyllum* was regarded to be the only species within the genus and family. Thomas (1903) first clarified a more extensive diversity of the group throughout its range and separated from the broadly-accounted species *R. microphyllum* a number of forms presently considered to be members of different species (*hardwickii*, *cystops*, *muscatellum*).

Ellerman & Morrison-Scott (1951) mentioned two large-sized monotypic species in the genus *Rhinopoma*, the Afro-Arabian *R. microphyllum* and the Indian *R. kinneari*. However, Felten (1962) showed high similarity of *microphyllum* and *kinneari* and suggested to regard these forms as

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species), however, certainly not *Rousettus aegyptiacus* as suggested by Anderson (1902). Therefore, Hasselquist's name may be a senior pre-Linnean synonym of the Brünnich's (1782) description (= *Vespertilio Microphyllus*), perhaps based on the same specimen/s, although Brünnich (1782: 51) quoted Hasselquist's finding in Egypt only indirectly. On the other hand, Brünnich mentioned a note by Belon du Mans (1553), who found bats of the genus *Rhinopoma* (according to his clear description) in Egypt in a "premiere cavité de la plus grande Pyramide". However, Hasselquist (1757) mentioned his species to be found "ad ripas Nili in hortis" [= in gardens on the banks of the Nile] (which probably caused an erroneous species identification by Anderson 1902) and not in "one of the small Pyramids in Gizeh" as Anderson (1902) pointed out in his type locality restriction. Hasselquist (1757, 1762) did not give any details how he obtained the bat in Egypt and thus the Anderson's (1902) restriction could reflect either an examination of the type material, although Anderson did not mention it, or an erroneous quotation of the record by Belon du Mans (1553) (but where 'grande' was changed to 'small') and certainly not that by Hasselquist (1757). Otherwise, Anderson's (1902) restriction should be completely wrong. Therefore, we suggest to restrict the type locality of *Vespertilio Microphyllus* according to the original Brünnich's (1782) description, i.e. 'Egyptian pyramids' which could refer to one or more pyramids in Egypt, in the area geographically defined as 'Lower Egypt in between Abu Rawash in the north and Beni Suef in the south'.

a single species under the former name. Kock (1969) analysed *R. microphyllum* in its whole range and found four subspecies; *R. m. microphyllum* (Lower Egypt, the Levant, Afghanistan, Rajastan), *R. m. kinneari* (from India to Malaya), *R. m. sumatrae* (Sumatra) and the newly described *R. m. tropicalis* (Sudanian savanna from Senegal to Sudan). Schlitter & DeBlase (1974) described a new form from southwestern Iran, *R. m. harrisoni*. Hill (1977) found all these subspecies to be valid in his review of Rhinopomatidae.

All the above mentioned authors considered the Levantine populations to belong to the nominotypical form *R. m. microphyllum*; this statement was accepted also by many others (Hayman & Hill 1971, Atallah 1977, Corbet 1978, DeBlase 1980, Harrison & Bates 1991, Qumsiyeh 1996, Schlitter & Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Horáček et al. 2000, Ferguson 2002).

Later, Nader & Kock (1982b) described a new subspecies from southwestern Saudi Arabia, *R. m. asirensis*, to be smaller than representatives of other known supspecies. Additionally, Khajuria (1988) described a separate species from Iraq, *R. hadithaensis*; terra typica of this species was defined as the Al-Fassayah cavern, 20 km SE of Haditha, Romadi Province, western Iraq, which lies ca. 120 km along the Euphrates flow from the Syrian border. Khajuria (1988) distinguished this species from the others on the basis of its (1) slightly different baculum, (2) "anterior end of penis converted into a sort of grasping organ", (3) large size, (4) paler coloration, and (5) enlarged nasal inflations. Based on some of these characters and on the dimensions of the holotype given, Kock et al. (2001) formally synonymised the Khajuria's description with *R. microphyllum* (= *R. m. microphyllum* according to the views by Hill 1977 and Van Cakenberghe & De Vree 1994).

Van Cakenberghe & De Vree (1994) revised the whole species content of *R. microphyllum* and identified only four subspecies; they synonymised the forms *tropicalis* and *harrisoni* with *microphyllum*, but accepted the valid status of the forms *kinneari*, *sumatrae* and *asirensis*. According to this most modern morphological revision, *R. m. microphyllum* occurs in the whole African part of the species range, plus northern Arabia (the Levant, Iraq), Iran, Afghanistan and Pakistan.

The Syrian populations, both the confirmed one from the Golan Heights and the possible new one from Mesopotamia, belong to the nominotypical subspecies, according to the above mentioned studies. As we did not have an opportunity to compare Syrian samples of *R. microphyllum*, we accept the conclusion by Mendelssohn & Yom-Tov (1999) who only examined individuals from the Syrian territory (Table 3).

Additionaly, in their most recent study, Hulva et al. (in press) performed a molecular genetic comparison of two individuals of *R. microphyllum* from the Holy Land and western India, i.e. of the nominative representatives of *microphyllum* and *kinneari*. The genetic distance between these samples was only 0.5% (geographical distance being ca. 3,500 km). This finding does not support a subspecies difference between these populations and suggests existence of a single form in the South Asian realm between Egypt and India. This result confirms the older presumptions by Kock (1969), Gaisler (1970), Hill (1977) and/or Van Cakenberghe & De Vree (1994) that the subspecies partition of *R. microphyllum* is rather unsubstantiated and was tentatively based only on a traditional view on the geographical separation among parts of its distribution range. According to these findings, the populations of *R. microphyllum* from Syria as well as the Holy Land and Iraq should belong to *R. m. microphyllum* too.

Rhinopoma hardwickii Gray, 1831

RECORDS. **Original data**: Quneitra / Golan Heights: Qala'at Nimrud [1], 18 July 1999: obs. dispersed colony of ca. 150–200 inds. (coll. 2 ms). – **Published data**: Quneitra / Golan Heights: Nahal Gilbon [2], summer 1989 (Shalmon 1990); – Golan Heights, two unidentified records mapped in central and southern parts of this region [roughly the areas of Ani'am and Ramot] (Mendelssohn & Yom-Tov 1999).

Table 3. Basic biometric data on examined Syrian and comparative samples of *Rhinopoma microphyllum* (Brünnich, 1782) and *Rhinopoma hardwickii* Gray, 1831. For abbreviations see pp. 10, 11. Part I. *R. microphyllum* (for details see text)

	Lebanon MNHN 1983-1632	Jordan NMP 47965	Palestine & Golan Hghts. (Mendelssohn & Yom-Tov 1999)			
			n	**M**	min	max
LAt	–	68.6	15	**65.67**	59.0	71.0
LCr	21.66	21.07	6	**20.63**	20.0	21.2
LCc	19.75	19.16	6	**18.87**	18.0	19.4
LaZ	12.90	12.79	6	**12.22**	11.6	12.7
LaI	2.67	2.75	6	**2.73**	2.3	3.6
LaN	8.88	9.05	6	**8.77**	8.1	9.4
ANc	8.05	8.13	–	–	–	–
CC	5.77	5.91	–	–	–	–
M^3M^3	9.67	9.68	–	–	–	–
CM^3	7.95	7.57	5	**7.36**	4.0	7.7
LMd	15.48	15.02	6	**14.85**	14.2	15.4
ACo	6.33	5.96	–	–	–	–
CM_3	8.48	8.20	6	**8.15**	7.9	8.5

	NE Africa					Afghanistan & India				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	2	**68.95**	66.8	71.1	3.041	15	**65.98**	62.5	70.8	2.457
LCr	10	**20.79**	19.91	21.45	0.537	25	**20.75**	19.72	22.29	0.600
LCc	10	**18.78**	17.77	19.39	0.503	25	**18.57**	17.74	19.92	0.558
LaZ	8	**12.43**	11.53	13.02	0.472	25	**12.09**	11.45	13.08	0.410
LaI	10	**2.59**	2.42	2.85	0.145	27	**2.66**	2.28	3.02	0.200
LaN	9	**8.97**	8.42	9.32	0.319	26	**8.82**	8.28	9.48	0.351
ANc	10	**7.42**	6.43	8.27	0.554	24	**7.10**	6.32	8.10	0.536
CC	10	**5.39**	4.79	5.76	0.278	27	**5.29**	4.76	6.12	0.277
M^3M^3	10	**9.40**	8.98	9.77	0.237	27	**9.10**	8.47	9.82	0.325
CM^3	10	**7.53**	7.07	7.81	0.232	27	**7.52**	7.14	7.84	0.210
LMd	9	**14.71**	14.02	15.14	0.411	27	**14.66**	13.75	15.78	0.487
ACo	9	**5.69**	5.38	6.02	0.191	27	**5.51**	4.75	6.18	0.296
CM_3	9	**8.15**	7.51	8.42	0.274	26	**8.21**	7.71	8.73	0.251

DISTRIBUTION. **General**. Similarly as in the previous species, *Rhinopoma hardwickii* has a Saharo-Sindian type of distribution (Hill 1977, Qumsiyeh & Knox Jones 1986, Van Cakenberghe & De Vree 1994). It inhabits arid and semi-arid parts of North Africa, the Middle East, and southern Asia in a range very similar to that of *R. microphyllum*. Also, a rather isolated population has been newly described from the Sunda Archipelago (Van Cakenberghe & De Vree 1994). *R. hardwickii* is found more frequently throughout the distribution area than the previous species and its range is known more precisely (Van Cakenberghe & De Vree 1994, Mendelssohn & Yom-Tov 1999, Benda et al. 2004a). In Africa, this bat occurs in Saharan and Sahelian countries from Senegal, Burkina, southern Ethiopia, and Somalia to the Maghreb, Libya, and Egypt. The Asian range comprises southern part of the Middle East incl. the whole Arabian Peninsula and southern parts of Iran, and the Indian Subcontinent from Afghanistan and southern India to Burma; it was recorded also in Thailand.

Near East. *R. hardwickii* inhabits the Rift Valley areas of Syria, Palestine and Jordan, and Mesopotamia of Iraq and Iran (Harrison & Bates 1991, DeBlase 1980). In the Near East, this species reaches northern margin of its distribution range.

Table 3. (continued) Part II. *Rhinopoma hardwickii*

	Syria					Lower Egypt & Holy Land					Iran				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	2	**57.20**	56.8	57.6	0.566	27	**57.56**	53.0	62.0	1.962	3	**57.47**	53.7	59.5	3.265
LCr	1	**17.88**	–	–	–	30	**17.88**	17.01	18.78	0.428	3	**17.24**	16.31	17.75	0.807
LCc	1	**15.88**	–	–	–	32	**15.81**	14.96	16.54	0.400	3	**15.78**	15.23	16.15	0.484
LaZ	2	**10.51**	10.48	10.53	0.035	32	**10.38**	9.88	11.02	0.262	3	**10.43**	10.24	10.64	0.201
LaI	2	**2.58**	2.32	2.84	0.368	33	**2.53**	2.22	2.84	0.154	3	**2.63**	2.53	2.81	0.156
LaN	2	**7.52**	7.40	7.64	0.170	33	**7.53**	7.13	7.87	0.171	3	**7.49**	7.32	7.69	0.188
ANc	1	**5.43**	–	–	–	32	**5.67**	5.34	6.26	0.215	3	**5.54**	5.40	5.73	0.172
CC	2	**4.28**	4.27	4.28	0.007	32	**4.37**	3.95	4.83	0.202	3	**4.73**	4.34	4.99	0.346
M^3M^3	2	**8.17**	8.15	8.18	0.021	33	**7.93**	7.31	8.38	0.258	3	**7.75**	7.49	7.88	0.222
CM^3	2	**6.25**	6.15	6.35	0.141	33	**6.09**	5.72	6.46	0.180	3	**6.22**	6.00	6.37	0.193
LMd	2	**12.22**	12.17	12.27	0.071	33	**12.18**	11.47	12.73	0.300	3	**12.27**	11.90	12.47	0.321
ACo	2	**4.74**	4.73	4.75	0.014	33	**4.69**	4.19	5.06	0.190	3	**4.56**	4.54	4.58	0.021
CM_3	2	**6.73**	6.63	6.83	0.141	33	**6.58**	6.13	6.94	0.189	3	**6.80**	6.63	6.90	0.148

	Upper Egypt					Southwestern Arabia					Afghanistan & India				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	19	**53.23**	50.0	57.2	1.488	17	**54.53**	50.5	58.3	1.902	11	**59.20**	56.1	62.3	2.063
LCr	23	**16.72**	15.76	17.49	0.401	30	**17.39**	16.37	18.82	0.555	16	**18.50**	17.50	19.47	0.561
LCc	23	**14.83**	14.21	15.60	0.303	30	**15.34**	14.41	16.43	0.458	18	**16.36**	15.55	17.62	0.500
LaZ	23	**9.81**	9.31	10.53	0.289	28	**9.99**	9.60	10.46	0.221	17	**10.91**	10.34	11.58	0.353
LaI	23	**2.43**	2.22	2.73	0.140	31	**2.53**	2.29	2.82	0.139	18	**2.80**	2.50	3.24	0.168
LaN	23	**7.14**	6.83	7.61	0.195	31	**7.32**	6.75	7.85	0.234	18	**8.16**	7.70	8.77	0.299
ANc	23	**5.37**	5.08	5.63	0.142	30	**5.48**	5.12	6.10	0.216	18	**6.01**	5.68	6.45	0.210
CC	23	**4.06**	3.68	4.51	0.191	31	**4.22**	3.92	4.71	0.182	18	**4.64**	4.16	5.04	0.262
M^3M^3	22	**7.49**	7.19	7.97	0.206	31	**7.59**	7.15	7.95	0.188	16	**8.01**	7.33	8.47	0.292
CM^3	23	**5.76**	5.57	6.05	0.125	31	**5.81**	5.47	6.15	0.169	17	**6.33**	6.05	6.81	0.189
LMd	23	**11.35**	10.61	11.83	0.281	31	**11.71**	11.06	12.55	0.334	18	**12.52**	11.76	13.27	0.426
ACo	23	**4.37**	4.08	4.72	0.150	31	**4.41**	4.03	4.75	0.189	18	**4.73**	4.37	5.22	0.245
CM_3	23	**6.23**	5.98	6.46	0.142	31	**6.25**	5.97	6.58	0.166	18	**6.81**	6.38	7.21	0.212

R. hardwickii has never been found in Lebanon, northern limits of its range in the Levant lie in northern Palestine and the Golan Heights (Harrison & Bates 1991, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999). In Palestine, it occurs mainly in the Rift Valley, from the Hula to Arava Valleys (Thomas 1913, Theodor & Moscona 1954, Harrison 1959, 1964a, 1972, Atallah 1977, Makin 1977, 1979, 1987, Qumsiyeh 1985, Shalmon 1989, Yom-Tov et al. 1992a, Mendelssohn & Yom-Tov 1999, Ferguson 2002); several records come also from the Judean Hills and the northern Coastal Plains (Harrison 1964a, Makin 1977, Qumsiyeh 1985, Shalmon 1989, Ferguson 2002). In Jordan, this species inhabits the western part of the country adjacent to the Rift Valley (Harrison 1959, Qumsiyeh et al. 1992, 1998, Qumsiyeh 1996, Benda & Sádlová 1999).

In Mesopotamia, rare records of *R. hardwickii* come from the middle and lower parts of the Euphrates Valley in Iraq (Field 1951, Sanborn 1956, Nader 1971, Khajuria 1988) as well as from the Persian part of this region (Lay 1967, DeBlase et al. 1973, Benda et al. 2004a)

Syria (Fig. 10). *R. hardwickii* is a rare bat in Syria, only four records are available (Table 1). They are confined only to the western part of the Golan Heights, where this bat was found repeatedly (Shalmon 1990, Mendelssohn & Yom-Tov 1999, our data). These findings connect the close area of its common distribution in the Hula Valley and around Lake Tiberias in northern Palestine: near

Tiberias (Theodor & Moscona 1954), Tiberias, Dan, Arbel, Wadi Amud (Harrison 1964a), Wadi Amud (Makin 1977), Kineret, Tiberias (Qumsiyeh 1985), Tiberias, Dan (Lachish), Wadi Amud (Qumsiyeh 1996). Since *R. hardwickii* is relatively common in northwestern Palestine and adjacent areas, it should be find also in other places in southwestern Syria which are rather arid and provide sufficient rocky shelters, e.g. the Al Yarmuk Valley. The closest record in the Jordan part of the area comes from Jerash, i.e. approximately 30 km from Syrian border (Harrison 1959).

Up to now, *R. hardwickii* has not been found in the Syrian part of Mesopotamia, although in the close Iraqi part of the Euphrates Valley this bat was found repeatedly in Haditha and its vicinity (Field 1951, Sanborn 1956, Nader 1971, Khajuria 1988) which is situated about 120 km along the Euphrates flow from the Syrian border (Fig. 10). Further research in suitable habitats in the Province of Deir ez-Zur will certainly bring records of this bat in the southeastern part of Syria. The common occurrence of other Mesopotamian elements such as *Taphozous nudiventris*, *Asellia tridens* and/or *Eptesicus bottae* in the lower part of Syrian Mesopotamia could support this assumption.

FIELD NOTES. In Syria, we found *Rhinopoma hardwickii* to roost at one place only, in rooms along the southern castle rampart of the Qala'at Nimrud in the Golan Heights (Figs. 11, 12). A colony of ca. 150–200 individuals occupied two towers, split into three parts: two groups of ca. 50 inds. at two places (storeys) of the Southwestern Tower, and one group of ca. 40 inds. in the Octogonal Tower (place nomenclature after Jacobs 1998). All these tower rooms were exposed to intensive sunshine (see Fig. 13) and relatively heated up, although the sites where the bats roosted remained shaded. The bats were dispersed on walls and ceilings of the rooms without direct contacts among individuals, they were active and flied immediately after being disturbed by our visit. The two examined individuals from the group in the Southwestern Tower were subadult males.

The same ruins, but their different parts (the relatively much darker and colder Western Gate Tower and the Guest Quarters in the northern ruins side), were used as shelters by single individuals of *M. blythii* and *R. ferrumequinum*.

Although bats of the genus *Rhinopoma* have been found in the diet of owls in Palestine and Iran (Dor 1947, Obuch unpubl.), it was not proved in the analysed samples of owl pellets from Syria.

MATERIAL EXAMINED. 2 ms (NMP 48268, 48269 [S+A]), Qala'at Nimrud, 18 July 1999, leg. P. Benda.

MORPHOLOGY. See Table 3 and Appendix III for biometric data on the Syrian specimens of *Rhinopoma hardwickii*.

TAXONOMY. *Rhinopoma hardwickii* is a polymorphic species, with four subspecies recognised in its whole distribution range (Kock 1969, DeBlase et al. 1973, Hill 1977, Qumsiyeh & Knox Jones 1986, Koopman 1994, Van Cakenberghe & De Vree 1994, Horáček et al. 2000, Simmons 2005); viz. *R. h. hardwickii* Gray, 1831 (terra typica: Bengal [India/Bangladesh]); *R. h. cystops* Thomas, 1903 (t.t.: Luxor, Egypt); *R. h. arabium* Thomas, 1913 (t.t.: Wasil, Yemen); asnd *R. h. sondaicum* Van Cakenberghe et De Vree, 1994 (t.t.: Sunda Archipelago [unspecified]).

Originally, only one species, *R. microphyllum*, with a very wide variation was recognised within the genus *Rhinopoma* (Dobson 1878, Anderson 1902), although some older authors suggested more species to occur in North Africa (e.g. Peters 1859, von Heuglin 1877). Thomas (1903) clarified a more extensive diversity of the group throughout its range, and identified five species (*microphyllum*, *hardwickii*, *cystops*, *sumatrae*, and *muscatellum*), of which the latter three ones he described as new names. Later, Thomas (1913, 1920) compared an additional material in detail, and depicted another three forms (*arabium*, *seianum*, and *pusillum*). Thomas (1913) mentioned

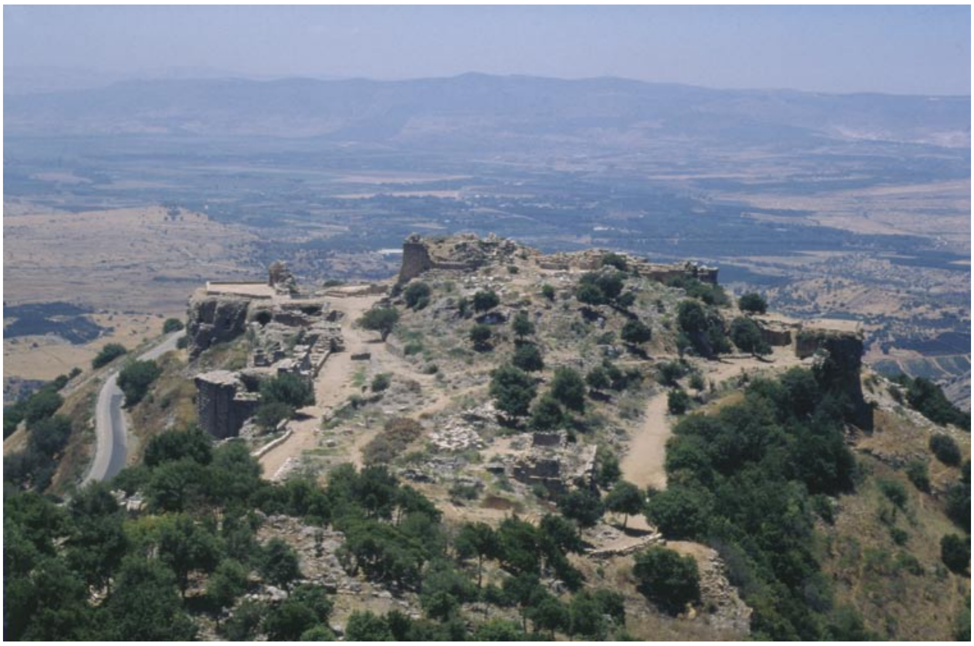

Fig. 11. Ruins of the crusader castle of Qala'at Nimrud looking down the Hula Valley. In the ruins, three bat species were found (*Rhinopoma hardwickii*, *Rhinolophus ferrumequinum* and *Myotis blythii*) (photo by P. Benda).

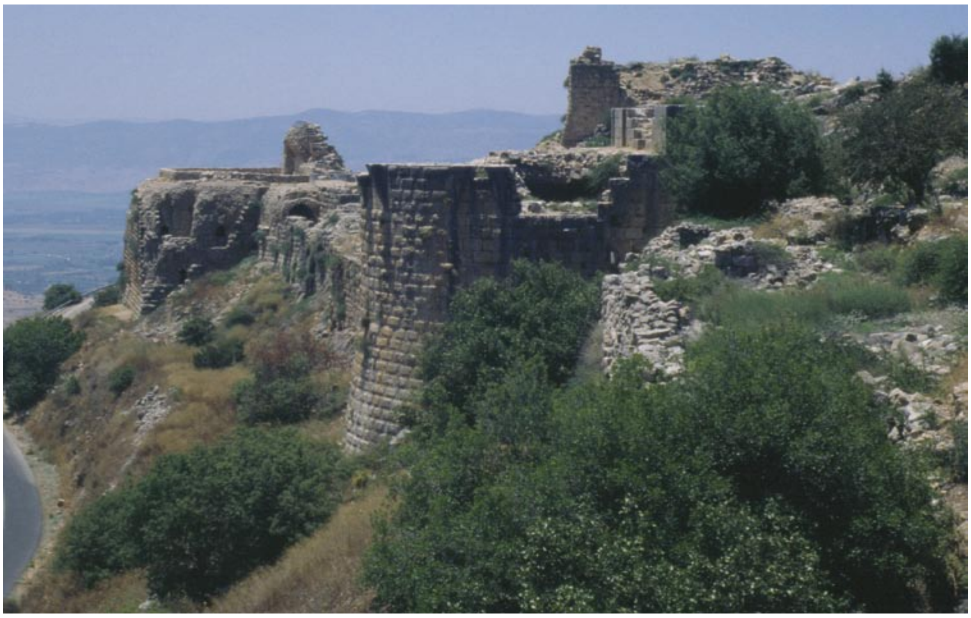

Fig. 12. Southern rampart of the Qala'at Nimrud castle. The Octogonal (centre) and the Southwestern Towers (left) were found to host a colony of *Rhinopoma hardwickii* (see Fig. 13) (photo by P. Benda).

one of the newly described forms, *R. cystops arabium*, to occur in Palestine, which was the first subspecies affiliation of the Levantine populations. Subsequently, Kinnear (1916) indicated the Mesopotamian population as *R. arabium*.

Thomas (1920) constituted a group of smaller species of *Rhinopoma*, '*cystops* group', in which he put six forms – species or subspecies (*hardwickii*, *cystops*, *arabium*, *muscatellum*, *seianum*, and *pusillum*). Ellerman & Morrison-Scott (1951) arranged Thomas's (1920) '*cystops* group' into a single but variable species, *R. hardwickii*, which they divided into six subspecies (*hardwickii*, *cystops*, *muscatellum*, *arabium*, *seianum*, and *pusillum*). With the exception of *hardwickii* and *cystops*, all these 'subspecies' were supposed to occur also in the Middle East. However, Harrison

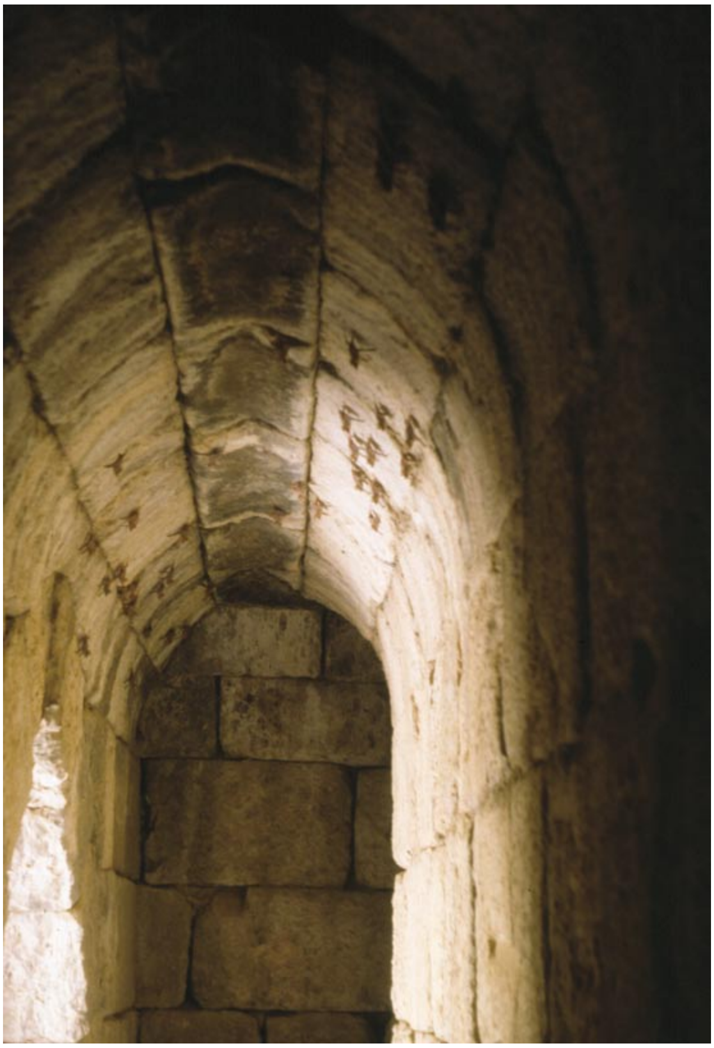

Fig. 13. Colony of *Rhinopoma hardwickii* Gray, 1831 in the Southwestern Tower of Qala'at Nimrud (photo by P. Benda).

(1956c) mentioned only *R. h. arabium* and *R. muscatellum* in Arabia; on the other hand, Sanborn (1956) reported *R. cystops cystops* from Iraq, while Hatt (1959) also *R. h. arabium*. Harrison (1964a) found two forms of *R. hardwickii* in Arabian Peninsula, *R. h. cystops* (W and N Arabia) and *R. h. muscatellum* (SE Arabia). Similarly Atallah (1977) mentioned *R. h. cystops* from the Levant, as well as Nader (1971) from Iraq.

Kock (1969) analysed variation of *R. hardwickii* in almost its whole range and found six subspecies, viz. *R. h. hardwickii* Gray, 1831 (India, Pakistan, E Afghanistan), *R. h. senaariense* (Fitzinger, 1866) (t.t.: Sanaar und Fazoglo bei Roseires, Sudan; distribution: African species range with the exception of parts in central Sahara and East Africa), *R. h. cystops* Thomas, 1903 (central Sahara), *R. h. muscatellum* Thomas, 1903 (t.t.: Wadi Bani Ruha, Muscat, Oman; distribution: SE Iran, Oman), *R. h. seianum* Thomas, 1913 (t.t.: Seistan; distribution: E Iran, S Afghanistan), and *R. h. macinnesi* Hayman, 1937 (t.t.: Bat Island, Lake Rudolf, Kenya; distribution: NE Kenya, SE Sudan, Somalia). In the Near East, Kock (1969) found only *R. h. sennaariense* (Fitzinger, 1866), which he stated to be a senior synonym of Thomas's (1913) *R. c. arabium*. However, later authors (Koopman 1975, Hill 1977) showed the Fitzinger's name to be a nomen nudum and thus, the name *R. hardwickii arabium* applicable for the respective populations.

DeBlase et al. (1973) raised a separate species from the species rank of *R. hardwickii*; they found *R. muscatellum* (incl. *seianum* and *pusillum*) occurring in sympatry with the former species in parts of southwestern Asia and differing from it in several morphological features. In the subsequent revision, Hill (1977) described the variation in *R. hardwickii* exactly in the sense of findings by Kock (1969) and DeBlase et al. (1973) and found four subspecies in the species (*hardwickii*, *cystops*, *arabium*, *macinnesi*); from the Middle East he mentioned only *R. h. arabium*. This opinion was subsequently supported by other authors (DeBlase 1980, Qumsiyeh 1985, 1996, Qumsiyeh & Knox Jones 1986, Harrison & Bates 1991, Qumsiyeh et al. 1992, 1998, Van Cakenberghe & De Vree 1994, Mendelssohn & Yom-Tov 1999, Snowden et al. 2000, etc.) for the populations of the Middle East. Different views occurred only exceptionally, e.g. Corbet (1978) considered the whole range of the species in North Africa and the Middle East to be of *R. h. cystops*, and perhaps following him, Ferguson (2002) mentioned this form from Palestine. However, the notion that in North Africa only one subspecies occurs was mentioned more often (e.g. Allen 1939, Sanborn & Hoogstraal 1955, Hayman & Hill 1971).

Khajuria (1988) described a new species from western Iraq, *R. hadithaensis*, which he distinguished from other species, besides other characters, mainly on the basis of different structures of its penis. Although most of the type series was coposed by *R. hardwickii* specimens, Kock et al. (2001) found this description to be synonymous with *R. microphyllum*.

In their comprehensive analysis, Van Cakenberghe and De Vree (1994) compared an extremely extensive material of ca. 1150 specimens of all described taxa of the family Rhinopomatidae (with an exception of the latter form by Khajuria 1988). They found four subspecies within *R. hardwickii*, with similar ranges as described by Kock (1969) and Hill (1977), but they found *R. macinnesi* to be a separate species and on the other hand, they described a new subspecies *R. h. sondaicum* Van Cakenberghe et De Vree, 1994 from the Sunda Archipelago. This final species arrangement was accepted by the following authors (Horáček et al. 2000, Kock et al. 2001, Benda et al. 2004a).

Benda et al. (2004a) compared a limited sample (over 70 specimens) of *R. hardwickii* coming from the western part of its distribution range. Based on the skull size, they found three principal forms in this area, (1) a small one, from Upper Egypt and Mauritania (it corresponds with *R. h. cystops*), (2) a large one, from NE Libya, and (3) medium-sized ones, from Lower Egypt, Arabia and Iran. The latter two categories correspond more or less with the variation range of *R. h. arabium*, but this form has shown to be extremely variable.

Most recently, Hulva et al. (in press) performed a molecular genetic analysis of the material coming from the northeastern part of Africa and from the Middle East (comp. Benda et al. 2004a). Their results complemented and also slightly surprisingly contradicted the morphological evidence and showed *R. hardwickii* to be extremely polymorphic throughout its range, however this polymorphism does not seem to reflect the phylogeographic history of the species. The analysis by Hulva et al. (in press) showed (1) the morphologically most different samples, that from Libya and Upper Egypt, to be genetically identical; (2) the SW Arabian and Levantine samples to be very close (genetic distance of 0.5%); (3) relatively low genetic distance of ca. 3% between the African and Arabian samples (1 and 2); and (4) deep genetic distance of 8–9% between the SW Persian samples and the remaining analysed samples from Arabia and North Africa.

Since the latter difference has been considered by Hulva et al. (in press) to be reasonable for species distinction, the tentative taxonomic interpretation of these findings should be as follows; (1) the populations of Iran and due to the geographic similarity probably also of Mesopotamia belong to a species different from the other analysed samples; Hulva et al. (in press) suggested the Indian form, *R. hardwickii*, which however differs from the Persian ones in some morphological characters (Hill 1977, Van Cakenberghe & De Vree 1994, Benda et al. 2004a, etc.) and thus, this taxonomic affiliation remains only preliminary. (2) the populations from western and southern parts of the Middle East and from Africa belong to another species, for which the prior name is *R. cystops* Thomas, 1903; (3) this species creates two populations genetically well separated, the African *R. c. cystops* and the Arabian *R. c. arabium*. Because these results are based on a limited

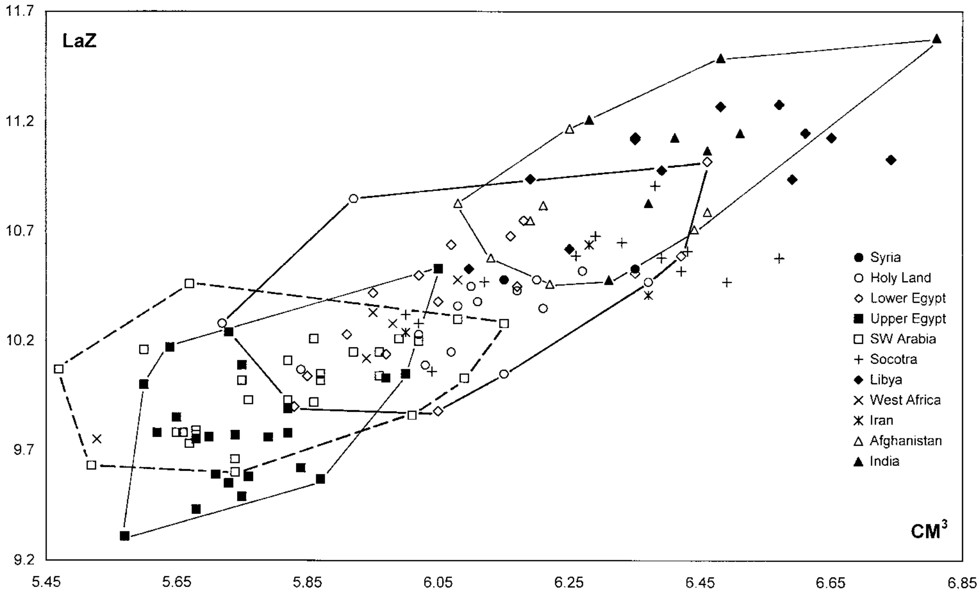

Fig. 14. Bivariate plot of examined Syrian and comparative samples of *Rhinopoma hardwickii* (s.l.): length of upper tooth-row (CM^3) against the zygomatic width (LaZ). Explanation: thin-lined polygon (smaller samples) = samples of *R. h. cystops* Thomas, 1903 (n=23); thin-lined polygon (larger samples) = samples of *R. h. hardwickii* Gray, 1831 (n=17); bold-lined polygon = samples of of *R. h. arabium* Thomas, 1913 from the Lower Egypt and the Holy Land (n=32); dashed polygon = samples of *R. h. arabium* Thomas, 1913 from Southwestern Arabia (incl. the type series; n=28).

number of examined populations only and their taxonomic expression is preliminary for the time being, we rather apply here the traditional view for the discussed species designation.

However, the results of phylogeographic analysis by Hulva et al. (in press) emerged partial unclearness concerning taxonomic classification of Syrian populations of the *R. hardwickii* complex. Since the individuals collected in the Golan Heights were included in the analyses by Benda et al. (2004a) and Hulva et al. (in press), their clear identification is undoubted. Geographically and according to their metrical and genetic traits (Table 3), they belong to the Palestinian/Jordani populations, i.e. *R. cystops arabium* sensu the above depicted scheme. However, the Mesopotamian populations, which most likely occur also in eastern Syria (see Distribution and Fig. 10), very probably belong to the Persian form, identified by Hulva et al. (in press) as *R.* cf. *hardwickii* ssp. Because the Persian form does not differ in metrical and skull characters from other populations of the Middle East and Lower Egypt (see Fig. 14, Table 3; see also the Table 1 by Benda et al. 2004a), its final species affiliation should be determined by a genetic analysis only.

A comparison of skull measurements (Figs. 14, Table 3) rather shows a continual than categorial shift of size from the south to the north both in northeastern Africa (Sudan, Egypt, Libya) and in Arabia from Yemen to the Holy Land. Surprisingly, the type and the topotype material of the names *cystops* (Upper Egypt) and *arabium* (Yemen) show very similar value variations in most dimensions (Table 3). This comparison well supports the conclusions by Hulva et al. (in press) on the considerable phenotypic plasticity within *R. hardwickii* s.l. which is not a direct consequence of phylogeographic history but is rather a reflection of local climatic conditions (see Kock 1969, Benda et al. 2004a). The similar geographical course of metric dimension differences in two sublineages suggests clinal shift from less arid northern regions in the Holy Land, Lower Egypt and northern Libya to very arid regions of Upper Egypt, northern Sudan and Yemen. On the other hand, the Socotran populations showed a more extensive metric shift from their closest samples – both geographically and genetically – the Yemeni ones, than exists between Yemeni and Palestinian samples. This finding may also confirm a climatic/biogeographic effect on the metric characteristics of the local populations, suggesting only a secondary similarity in morphocharacters between the respective populations.

***Taphozous nudiventris* Cretzschmar, 1830**

Records. **Original data**: Deir ez Zur: As Salihiyyah [1], ruins of ancient Dura Europos, 19 June 1998: 1 ind. from *Tyto alba* pellet; – Ayyash [2], dry wadi of a small tributary of the Euphrates river, 19 May 2001: net. 1 faG (NMP 48826 [A]); – Halabiyyeh [3], ruins of ancient fortress city, 7 October 1995: 4 inds. from *Tyto alba* pellets; crevices between stones in a city wall chamber, 17 June 1998: obs. a colony of ca. 150 inds. (coll. 4 faG, 1 fa); 17 June 1998: 7 inds. from *Tyto alba* pellets; 15 April 2001: 15 inds. from *Tyto alba* pellets; 14 May 2001: obs. dispersed colony of ca. 50 inds. (coll. 6 faG, 1 mj); – Qala'at ar Rahba [4], castle ruins, 17 May 2001: obs. 1 ind. in a wall fissure; – Zalabiyyeh [5], rocks under ancient ruins, 15 April 2001: 10 inds. from *Tyto alba* pellets. – Hassake: Khazneh [6], Jebel 'Abd al 'Aziz, cave, 17 May 2001: net. 1 fa, 1 faG. – Raqqa: Rasafah [7], ancient ruins, 9 October 2004: obs. colony of ca. 6 inds. in a wall crevice, exam. 1 fs. – **Published data**: Deir ez Zur: Halabiyyeh [3], in crevices of antique city wall, 31 May 1989: obs. a colony, coll. 1 m, 2 faG (Shehab et al. 2004). – Raqqa: Casret-Mohamed-Ali (= Kisret Mhamadali) [8], 1994: 1 ad., 8 juv. inds. from *Tyto alba* pellets (Ebenau 1994, 1996); 19 March 1996: 2 ad., 4 juv. from *Tyto alba* pellets (Shehab et al. 2004); 28 June 1998 [not specified] (Shehab et al. 2004). – Raqqa: Qater Maghara, SE of Ratla (= Qatr Magara), from *Tyto alba* pellets [9] (Sachanowicz et al. 1999), 22 March 1993: 2 inds. from *Tyto alba* pellets (Shehab et al. 2004).

Possible record (Syria *sensu lato*). **Published data**: Expedition to the Euphrates, 1836, 3 inds. ad. (Dobson 1878, cf. Trouessart 1879, Anderson 1881, Thomas 1915, Shehab et al. 2004).

Distribution. **General**. *Taphozous nudiventris* is a Saharo-Sindian species which inhabits dry areas of northern part of Africa, the Middle East, and southern Asia (Koopman 1994, Horáček et al. 2000). The African range includes parts of the Sahara, Sahel and of savanna regions, from

Cape Verde Islands, Senegal and Morocco, to Tanzania, Somalia and Egypt (Kock 1969, Hayman & Hill 1971). In the Middle East it occurs from southeastern Turkey to western and southwestern Iran and in the whole of Arabia (DeBlase 1980, Harrison & Bates 1991, Sachanowicz et al. 1999). In the Oriental Region, *T. nudiventris* ranges from southeastern Afghanistan over Pakistan and India to western Burma (Bates & Harrison 1997).

Near East. *T. nudiventris* occurs in two well separated areas of the Near East, in the Rift Valley area of Palestine and Jordan and in Mesopotamia from Turkey to southwestern Iran. These two populations are geographically widely separated by an approximately 400 km broad belt of deserts (Shehab et al. 2004). In the Near East, *T. nudiventris* reaches northern margin of its distribution range.

In Turkey, *T. nudiventris* has been found quite recently, but repeatedly, at the only site close to the Euphrates Valley, at Mağaracik near Nizip (Sachanowicz et al. 1999, Karataş & Sözen 2002, Aşan & Albayrak in press, Karataş & Sachanowicz in press).

This bat remains unknown in Lebanon. In Palestine, it was found at Lake Tiberias (Tristram 1866, 1884, Bodenheimer 1935, Harrison 1964a, Qumsiyeh 1985, Makin 1977, 1987, Mendelssohn & Yom-Tov 1999) and in the Jordan Valley (Allen 1915, Aharoni 1930, Bodenheimer 1935, Qumsiyeh 1985, 1996, Makin 1977, 1987, Mendelssohn & Yom-Tov 1999). Theodor & Moscona (1954) and Makin (1979) reported this species from Tel Aviv, Harrison (1964a) and Qumsiyeh (1985) from near Haifa. Mendelssohn & Yom-Tov (1999) referred about records in

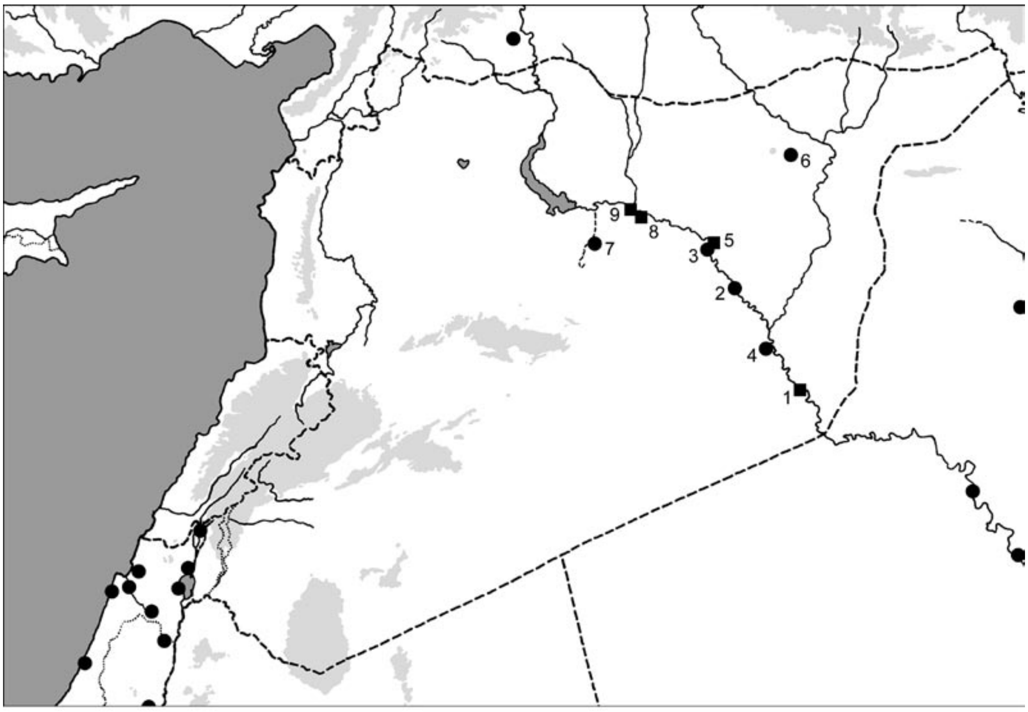

Fig. 15. Records of *Taphozous nudiventris* Cretzschmar, 1830 in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

the Yagur, ‘Atlit, Yizre’el and Zevulun Valleys. Ferguson (2002) mentioned, among others, also findings in the Hula Valley. In Jordan, *T. nudiventris* was reported from two sites near the Dead Sea (Darweesh et al. 1997, Al-Omari et al. 2000, Amr 2000).

T. nudiventris has been commonly found in middle and lower Mesopotamia. In Iraq, it occurs mainly along the big rivers; from the Euphrates, this bat was reported between Haditha in the west and Qurna on the confluence with the Tigris (Dobson 1878, Thomas 1915, Harrison 1956b, 1959, Al-Robaae 1966, 1968, Nader 1969, Shamsuddin & Mohammad 1978, Mahmoud & Jawdat 1982). On the Tigris, the records come from Hatra to Qurna (Cheesman 1920, Sanborn 1940, Weber 1955, Harrison 1964a, Al-Robaae 1966, 1968, Mahmoud & Jawdat 1982, Nadachowski et al. 1990) and also from along the entire flow of the Shat al Arab River from Qurna to Fao (von Wettstein 1913, Thomas 1915, Cheesman 1920, Sanborn 1940, Al-Robaae 1968, Al-Shenawi et al. 1982, Mahmoud & Jawdat 1982). In Iran, this bat has been recorded from western portion of the country only, including environs of Lake Urumiya (Lay 1967, DeBlase 1980), near Tehran (Etemad 1967) and southeastern Mesopotamia from Bisotun in the Zagros Mts to Bandar-e-Gonaveh on the Persian Gulf shore (DeBlase 1980, our unpubl. data).

Syria (Fig. 15). *T. nudiventris* is a medium-frequent bat in Syria, nine records are known (Table 1). This bat has been recorded only in the basin of the Euphrates. The previous authors (Ebenau 1994, 1996, Sachanowicz et al. 1999, Shehab et al. 2004) documented its distribution along the middle flow of the Syrian part of the Euphrates [3, 8, 9]. Our data show the occurrence of this species along the entire Euphrates between Raqqa and Iraqi border [1–5] as well as in areas adjacent to the Euphrates Valley, in Rasafah [7] and close to the Khabur River [6]. These findings of *T. nudiventris* connect its known distribution in Mesopotamia, i.e. the records from Turkish Nizip area (Sachanowicz et al. 1999) with Iraqi sites of Haditha (Shamsuddin & Mohammad 1978) and Hatrah (Nadachowski et al. 1990), and those in northwestern Iran (Etemad 1967, Lay 1967, our unpubl. data). This distributional pattern suggests more common occurrence of this bat in an arid belt south of and in the southern Armenian Highlands and Zagros Mountains, although most findings come from regions rich in suitable shelters such as the Euphrates or Tigris Valleys. Thus, the northern margin of the range of *T. nudiventris* in the Near East should go north of the southeastern border of Turkey.

No records of *T. nudiventris* are known from southwestern Syria, despite its known occurrence in the areas adjacent to Lake Tiberias (Tristram 1884, Thomas 1915, Harrison 1964a, Qumsiyeh 1985) and in the Hula Valley (Ferguson 2002). More research in suitable habitats in the Golan Heights would probably bring records of this bat in the southwestern corner of Syrian territory.

Dobson (1878) reported three BMNH specimens of *T. nudiventris* that were collected in 1836 during the ‘Expedition to the Euphrates’ under the command of Sir George Chesney (Thomas 1906). Based on these specimens, Thomas (1915) described a new form, *Taphozous kachhensis babylonicus*. The Euphrates Expedition has been described in detail by the Countess Pauline Nostitz who joined the Chesney’s Expedition (Nostitz 1873) and later also by William Francis Ainsworth, a surgeon and geologist of the Expedition (Ainsworth 1888). Nostitz (1873) delineated the course of the Expedition along the Euphrates in the chapter ‘Mit der englischen Euphrat-Expedition unter Colonel Chesney’ (Nostitz 1873: 182–299) and Ainsworth (1888) precisely described the whole journey in his book. The Euphrates part of the journey began in Birecik (present-day Turkey) on 16 March 1836 with two ships sailing on the Euphrates and slowly continued to Balis, which was reached on 19 April (Nostitz 1873: 218: “erst 100 englische Meilen haben wir bis hierher in 34 Tagen zurückgelegt”). Majority of the collections were gathered during this part of the journey. In Balis, there was a break for 18 days (19 April to 7 May) and the existing collections were packed up and sent to Aleppo (= Halab) and later, from Aleppo to Europe. Between 7 and 21 May 1836, the expedition relatively quickly moved from Balis to As Salihiyyah. Here, a windstorm hit the ships; one of the ships was totally damaged and dipped, the other one finished there with serious damages. With most probability, the Expedition got the all collections gathered on the way from Balis lost as well as the complete data concerning the collections. After this crucial accident and after a repair of the remaining ship, the Expedition moved to Baghdad and most probably, it did not continue collecting. Therefore, the material mentioned by Thomas (1906) was most presumably collected during the Expedition course between Birecik and Balis. This conclusion is supported also by Foetterle's (1860) short description of the journey.

Thomas (1915) mentioned the type locality of *T. k. babylonicus* as 'Euphrates, Mesopotamia' which could comprise an extensive area lying in the present-day Turkey, Syria, and Iraq. Although Nostitz (1873) nor Ainsworth (1888) did not mention an episode describing collection of any *Taphozous* during the Euphrates Expedition, according to the above facts we can restrict the type locality of *Taphozous kachhensis babylonicus* Thomas, 1915 more precisely to 'the part of the Euphrates Valley between Birecik, Turkey, and Balis, Syria'. Thus, the accurate site of collection of the type series of the Thomas' (1915) description lies most probably in the present-day Syria, as Shehab et al. (2004) suggested. The assumption by Ellerman & Morrison-Scott (1951), Harrison (1964a) and Harrison & Bates (1991) that the type locality lies in the Iraqi part of the Euphrartes Valley, which was based on the formerly imperfectly known distribution range of *T. nudiventris* in the Near East, seems to be incorrect.

FIELD NOTES. In Syria, *Taphozous nudiventris* was found most often in its roosts. They were situated in ruins of castles and in ancient buildings where the species used as shelters narrow and deep fissures between stone blocks. A colony of *T. nudiventris* was recorded repeatedly in ruins of the fortress city of Halabiyyeh (Figs. 16, 17). The first finding of this colony was reported by Shehab et al. (2004) from May 1989, further records come from June 1998 and April 2001. The size of the colony roosting in towers in the city walls has been estimated at 50 to 150 individuals. In June 1998 the colony was concentrated at one place (after sunset, altogether 135 bats were counted within twenty minutes when leaving the roost in groups of several inds.), while in May 2001 the colony was dispersed among eight places in the western wall towers. Similarly, a small colony of *T. nudiventris* was found in a fissure between stone blocks of walls of the ruined ancient city of Rasafah in October 2004 (Fig. 94). In the ruined castle of Qala'at ar Rahba, only one individual was observed and no signs of a colony were found. *T. nudiventris* was netted only twice, in both cases the mist-net was not situated above a water body but at an entrance of a small cave above the village of Khazneh (Fig. 98) and under a historical bridge span over dry wadi of a small tributary of the Euphrates at Ayyash. The recorded types and characteristics of *T. nudiventris* roosting places in Syria are very similar to those reported by Al-Robaae (1966, 1968) from Iraq or by Gaisler et al. (1972) and Qumsiyeh (1985) from Egypt. They were never completely in the darkness, but always partially under the influence of daylight (Fig. 17). However, contrary to the findings from Iraq and Iran (Harrison 1956b, Al-Robaae 1968, DeBlase 1980, our data), no summer roosts of *T. nudiventris* in Syria were found in inhabited brick houses or in wooden ceilings and roofs of different buildings or in natural and/or artificial caves.

T. nudiventris was found to be a sole component of the Syrian semi-desert bat fauna, it was syntopic only with similar faunal elements such as *A. tridens*, *E. bottae* and *P. kuhlii* (Halabiyyeh), *A. tridens*, *P. kuhlii* and *O. hemprichii* (Qala'at ar Rahba), *E. bottae*, *P. kuhlii* and *O. hemprichii* (Khazneh), *P. kuhlii*, *O. hemprichii* and *T. teniotis* (Ayyash), and *P. kuhlii* and *O. hemprichii* (Rasafah).

On 31 May 1989, two pregnant females were collected in Halabiyyeh, each contained one foetus, their weights being 4.6 and 6.5 g. On 17 June 1998, three pregnant females were collected

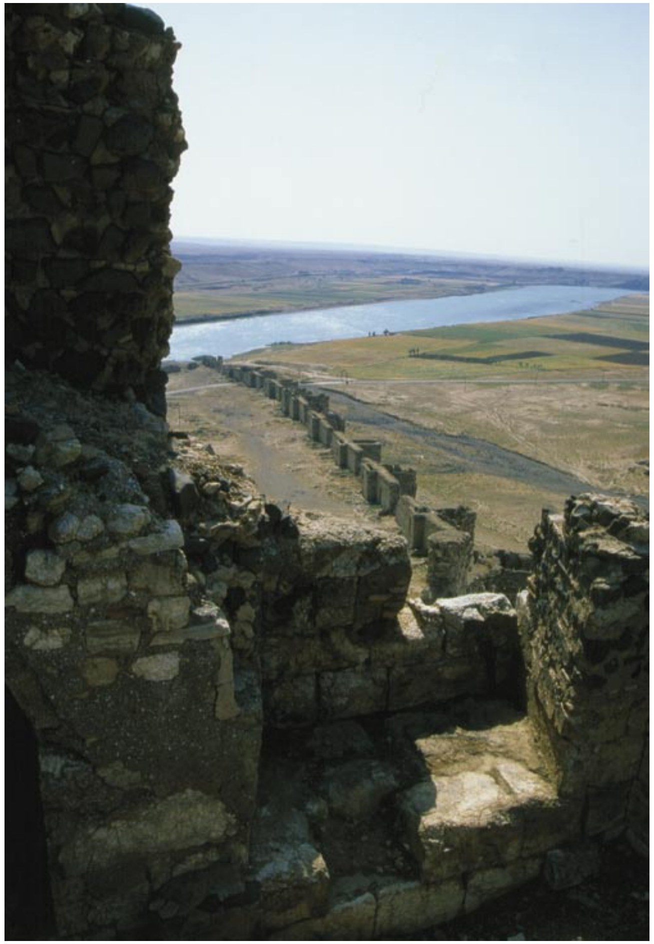

Fig. 16. Ruins of the ancient fortress city of Halabiyyeh above the middle flow of the Euphrates. In towers of the western city wall were found colonies of *Taphozous nudiventris* (see Fig. 17) and of *Asellia tridens* (photo by A. Reiter).

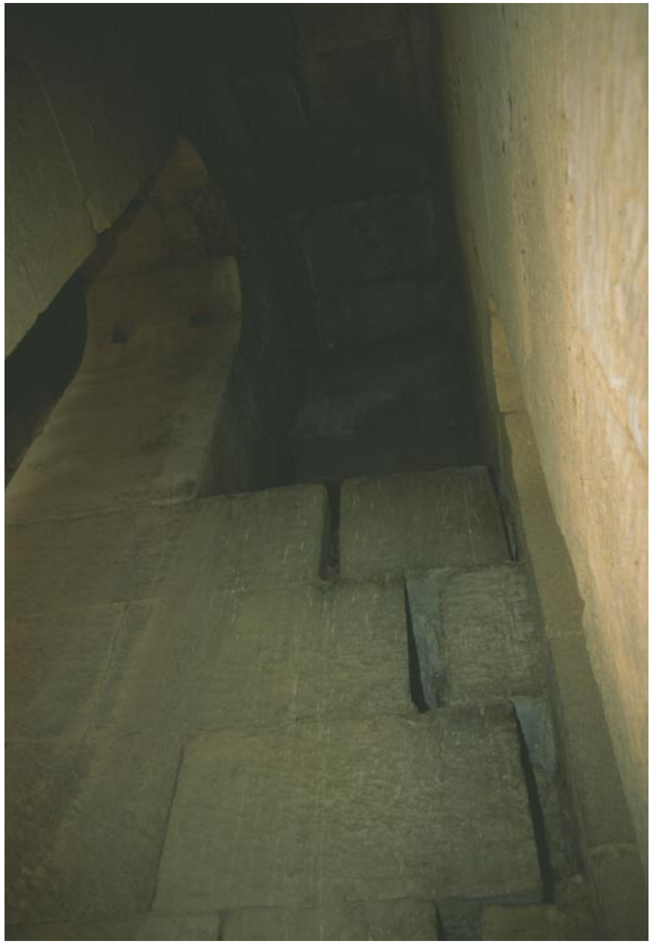

Fig. 17. Crevices between ceiling and wall stones in the wall tower of Halabiyyeh used as shelters by a colony of *Taphozous nudiventris* (photo by A. Reiter).

at the same place, each contained one foetus, their crown-rump length varied from 37 to 47 mm (mean 40.7 mm). On 14 May 2001, a sample of six pregnant females was collected at the site, each female contained one foetus of the length varying from 22.6 to 27.0 mm (mean 25.8 mm), and a juvenile male with LAt of 77.2 mm (i.e., on lower margin of LAt range in adults, or 97.1% of mean from adults, respectively). On 17 May 2001, two adult females were collected at Khazneh, one of them was pregnant and contained one foetus 24.0 mm long. On 19 May 2001, one pregnant female was collected at Ayyash, containing a foetus 28 mm long. On 8 October 2004, one juvenile female was examined (LAt=77.1) at Rasafah. The findings of pregnancy in May and June at more places of Syria rather correspond with the results given by Al-Robaae (1968), who reported births in the fourth week of May in the Iraqi Mesopotamia. Our findings suggest timing of births in the latest weeks of spring and even in summer. Al-Robaae (1968) also found births in this species to be synchronised to a period of ca. ten days and the almost identical stages of foeti development recorded in Syria support this hypothesis as well.

Similarly as in other parts of the Middle East (Dor 1947, Nader 1969, Obuch unpubl.), remains of *T. nudiventris* were found in owl diet in Syria (Ebenau 1994, 1996, Sachanowicz et al. 1999, Shehab et al. 2004, our data). In our analysis, *T. nudiventris* was detected in four samples of the diet of the barn owl, *Tyto alba*, collected at three sites (see Records and Table 35), and its remains represented 0.04–0.81% per sample of all prey items of barn owl diet from Syria (0.05–0.91% of mammalian and 0.65–5.38% of bat items per sample) (Table 35). Ebenau (1994, 1996) found

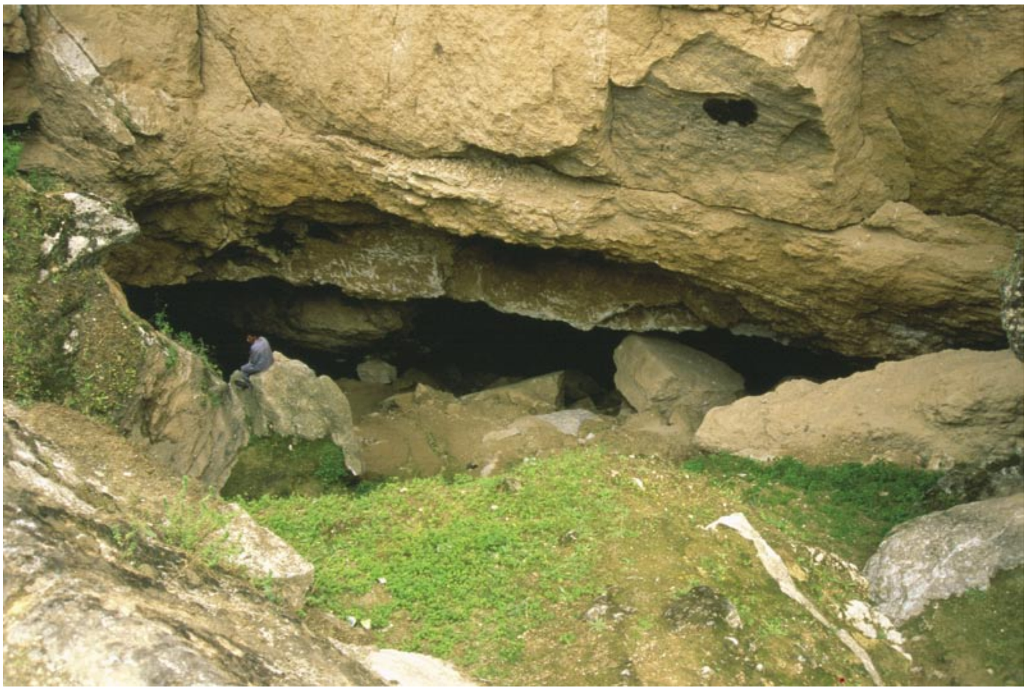

Fig. 18. Entrance into an extensive cave system of Qatr Magara, in the Euphrates Valley SE of Raqqa. Finding place of one of the richest bat community in Syria, composed of *Taphozous nudiventris*, *Rhinolophus ferrumequinum*, *R. mehelyi*, *Asellia tridens*, *Myotis capaccinii*, *Eptesicus serotinus*, *E. bottae*, *Pipistrellus kuhlii*, and *Miniopterus schreibersii* (Ebenau 1994, 1996, Shehab et al. 2004) (photo by A. Reiter).

T. nudiventris in *T. alba* pellets at Kisret Mhamadali, Shehab et al. (2004) did at the same place and also at Qatr Magara (Fig. 18).

Material examined. 1 fa (NMP 48826 [S+A]), Ayyash, 19 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 m, 2 faG (SMF 74084–74086 [S+A]), Halabiyyeh, 31 May 1989, leg. D. Kock; – 4 fa (NMP 48015–48018 [S+A]), Halabiyyeh, 17 June 1998, M. Andreas, P. Benda & M. Uhrin; – 15 inds. (NMP 90355; 6 skulls, 2 rostra, 5 right maxillae, 6 left maxillae, 12 left mandibles, 15 right mandibles, from owl pellets), Halabiyyeh, 15 April 2001, leg. J. Obuch; – 7 inds. (NMP 90356; 3 skulls, 3 rostra, 1 pair of rostral fragments, 6 left mandibles, 5 right madibles, from owl pellets), Halabiyyeh, 17 June 1998, leg. J. Obuch; – 6 fa, 1 mj (NMP 48793, 48795, 48796, 48798, 48799 [S+A], 48794 [S+B], 48797 [A]), Halabiyyeh, 14 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 fa (NMP 48822, 48823 [S+A]), Khazneh, Jebel ‘Abd al ‘Aziz, 17 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 ad., 4 juv. inds. (SMF 84474–84479; 5 right and 2 left maxillae, 4 skull fragments, 6 left and 6 right mandibles, from owl pellets), Casret-Mohammed-Ali (= Kisret Mhamadali), 19 March 1996, leg. C. Ebenau; – 1 ad., 1 juv inds. (SMF 80666; 1 rostrum, 2 calvae, 2 left mandibles, from owl pellet), Cater (= Qatr) Magara, 22 February – 4 March 1993, leg. C. Ebenau; – 10 inds. (NMP 90357; 3 skulls, 3 left maxillae, 1 right maxilla, 10 left mandibles, 6 right mandibles, from owl pellets), Zalabiyyeh, 15 April 2001, leg. J. Obuch.

Morphology. See Table 4 and Appendix III for biometric data on the Syrian specimens of *Taphozous nudiventris*. A skull of *T. nudiventris* from Syria is shown in Fig. 19.

Taxonomy. *Taphozous nudiventris* is a polytypic species, up to five subspecies are currently recognised in its whole distribution range (Felten 1962, Kock 1969, Corbet 1978, Koopman 1994, Horáček et al. 2000, Simmons 2005); viz. *T. n. nudiventris* Cretzschmar, 1830 (terra typica: pyramids of Giza, Egypt); *T. n. kachhensis* Dobson, 1872 (t.t.: Kachh [= Cutch, W India]); *T. n. magnus* von Wettstein, 1913 (t.t.: Basra [SE Iraq]); *T. n. nudaster* Thomas, 1915 (t.t.: Pagan, near Mt. Popa, Burma); and *T. n. zayidi* Harrison, 1955 (t.t.: Al Ain, Buraimi Oasis, Oman [= Al Ain, Abu Dhabi Emirate, United Arab Emirates])*.

The current species content was primarily ascribed to two species, *T. nudiventris* and *T. kachhensis* (Dobson 1872). However, soon after that, Dobson (1875, 1878) doubted his first view and suggested possible conspecificity of both taxa which he treated as subspecies of *T. nudiventris*. This conclusion was mentioned by later authors (e.g. Anderson 1881, Trouessart 1897, 1904). Also, Dobson (1878) first mentioned the occurrence of *T. nudiventris* in the Euphrates Valley based on three specimens collected by the Euphrates Expedition, which was later described by Thomas (1915) as a distinct form *T. kachhensis babylonicus*. As explained above (see Distribution), Dobson's and Thomas' notes are probably the first record of this bat in Syria. However, von Wettstein (1913) described a new species *T. magnus* from Basra (Iraq), which actually represents a senior synonym of the Thomas' description (Cheesman 1920).

Thomas (1915) showed specific distinctions between *T. nudiventris* and *T. kachhensis* (which included three subspecies in that time, *kachhensis*, *babylonicus* [= *magnus*] and *nudaster*) and this opinion was accepted by subsequent authors (e.g. Cheesman 1920, Sanborn 1940, Ellerman & Morrison-Scott 1951, Harrison 1955, 1956b, c, Weber 1955, Hatt 1959, Brosset 1962, etc.). Additionally, Harrison (1955) described a new subspecies of *T. nudiventris* s. str., named *T. n. zayidi*, from southeastern Arabia on the basis of its different coloration. However, Felten (1962) found again arguments for the conspecificity of *T. nudiventris* and *T. kachhensis* and since then, these forms have been broadly considered to be one species which includes five subspecies as mentioned above (Harrison 1964a, Kock 1969, Gaisler 1970, Corbet 1978, DeBlase 1980, Harrison & Bates 1991, Koopman 1993, 1994, Bates & Harrison 1997, Horáček et al. 2000, Simmons 2005).

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* Note. Jentink (1888) mentioned *Vespertilio murinus* [= *M. myotis* s.l.] coming from Syria (= Syria *s.l.*), deposited in the Museum of Leiden, under a name *Taphozous syriacus*, vend. Schneider. However, the name *T. syriacus* is apparently a nomen nudum.

Table 4. Basic biometric data on examined Syrian and comparative samples of *Taphozous nudivetris* Cretzschmar, 1830, and the results of the ANOVA analysis (for details see the text). For abbreviations see pp. 10, 11, T = type specimen

			Syria					Iraq & Iran			T *magnus*
	n	**M**	min	max	SD	n	**M**	min	max	SD	NMW 8377
LAt	17	**79.49**	77.3	81.1	1.109	3	**81.10**	79.5	83.3	2.263	83.3
LCr	15	**29.17**	27.73	30.05	0.697	7	**28.40**	26.11	29.77	1.336	29.77
LCb	15	**25.93**	25.17	26.40	0.349	7	**25.90**	25.44	26.32	0.360	26.15
LCc	14	**26.33**	25.74	27.04	0.296	8	**26.24**	25.45	26.83	0.522	–
LaZ	14	**17.46**	16.99	17.90	0.309	10	**17.40**	17.07	18.10	0.360	18.10
LaI	15	**5.24**	4.88	5.49	0.164	10	**4.88**	4.47	5.17	0.222	–
LaN	15	**12.31**	11.73	13.02	0.369	11	**12.66**	11.92	13.13	0.363	12.55
ANc	14	**9.60**	8.64	10.40	0.479	9	**9.30**	8.07	9.74	0.501	–
CC	15	**6.76**	6.53	6.93	0.126	8	**6.59**	5.97	6.97	0.300	–
M^3M^3	15	**11.70**	11.33	11.98	0.172	8	**11.47**	11.12	11.88	0.266	–
CM^3	15	**12.16**	11.78	12.55	0.218	10	**12.21**	11.90	12.71	0.249	12.71
LMd	15	**21.91**	21.38	22.69	0.363	11	**22.01**	21.47	22.73	0.398	22.73
ACo	14	**8.31**	7.95	8.67	0.196	8	**8.40**	8.06	8.69	0.219	–
CM_3	15	**13.67**	13.23	14.37	0.299	10	**13.62**	12.95	14.40	0.392	14.40
			India & Afghanistan					Egypt & Sudan			T *nudiventris*
	n	**M**	min	max	SD	n	**M**	min	max	SD	SMF 4310
LAt	23	**73.83**	68.0	77.5	2.162	33	**69.38**	64.0	73.8	2.402	–
LCr	19	**26.20**	24.57	27.67	0.846	27	**25.31**	23.38	27.35	1.120	–
LCb	19	**23.81**	23.12	24.55	0.407	28	**23.32**	21.97	24.26	0.604	–
LCc	24	**24.23**	23.73	25.64	0.435	37	**23.87**	22.76	24.92	0.525	–
LaZ	24	**15.97**	15.33	16.95	0.405	38	**15.17**	13.67	16.44	0.634	–
LaI	26	**4.91**	4.42	5.29	0.231	41	**5.02**	4.43	5.62	0.255	4.88
LaN	26	**12.11**	11.38	12.97	0.384	37	**11.56**	10.69	12.92	0.532	–
ANc	25	**8.45**	7.57	9.26	0.446	36	**7.95**	7.17	9.02	0.525	–
CC	26	**5.87**	5.43	6.36	0.227	41	**5.63**	5.19	6.17	0.271	6.12
M^3M^3	26	**10.73**	10.28	11.32	0.217	41	**10.48**	9.76	11.22	0.319	10.83
CM^3	26	**11.23**	10.83	11.81	0.237	41	**11.05**	10.47	11.51	0.235	11.07
LMd	27	**20.08**	19.56	21.01	0.341	41	**19.64**	18.74	20.89	0.536	20.43
ACo	27	**7.47**	6.93	7.88	0.225	41	**7.30**	6.59	7.88	0.321	7.76
CM_3	27	**12.59**	11.92	13.04	0.289	41	**12.39**	11.84	12.88	0.243	12.47
			magnus (Syria, Iraq, Iran)					other forms (Africa, S Asia)			ANOVA
	n	**M**	min	max	SD	n	**M**	min	max	SD	F p
LAt	20	**79.84**	77.3	83.3	1.488	56	**71.21**	64.0	77.5	3.180	135.87 ***
LCr	22	**28.92**	26.11	30.05	0.984	48	**25.65**	23.38	27.67	1.084	145.17 ***
LCb	22	**25.92**	25.17	26.40	0.344	49	**23.52**	21.97	24.55	0.569	335.36 ***
LCc	22	**26.29**	25.45	27.04	0.383	63	**24.01**	22.76	25.64	0.515	362.24 ***
LaZ	24	**17.43**	16.99	18.10	0.326	64	**15.47**	13.67	16.95	0.672	188.06 ***
LaI	25	**5.10**	4.47	5.49	0.258	69	**4.98**	4.42	5.62	0.248	4.49 *
LaN	26	**12.46**	11.73	13.13	0.400	65	**11.78**	10.69	12.97	0.539	34.35 ***
ANc	23	**9.48**	8.07	10.40	0.499	63	**8.14**	7.17	9.26	0.547	105.73 ***
CC	23	**6.70**	5.97	6.97	0.214	69	**5.72**	5.19	6.36	0.276	237.77 ***
M^3M^3	23	**11.62**	11.12	11.98	0.231	69	**10.57**	9.76	11.32	0.308	223.32 ***
CM^3	25	**12.18**	11.78	12.71	0.227	69	**11.11**	10.47	11.81	0.250	351.48 ***
LMd	26	**21.95**	21.38	22.73	0.373	70	**19.81**	18.74	21.01	0.508	384.69 ***
ACo	22	**8.34**	7.95	8.69	0.204	70	**7.37**	6.59	7.88	0.293	211.41 ***
CM_3	25	**13.65**	12.95	14.40	0.332	70	**12.46**	11.84	13.04	0.280	298.66 ***

From northeastern Africa and the Middle East, two forms of *T. nudiventris* are mentioned (Ellerman & Morrison-Scott 1951, Harrison 1956c, 1964a, Kock 1969, Corbet 1978, Harrison & Bates 1991, etc.); the smaller *T. n. nudiventris* inhabits the African part of the species range and the Rift Valley of Palestine and Jordan as well as southwestern Arabia (Hayman & Hill 1971, Gaisler et al. 1972, Nader 1975, 1982, Atallah 1977, Qumsiyeh 1985, Al-Jumaily 1998, Mendelssohn & Yom-Tov 1999, Ferguson 2002); the larger *T. n. magnus* occurs in a relatively limited region of Mesopotamia and adjacent areas, including southeastern Turkey, Iraq, western Iran and Bahrain and the Das Island in the Persian Gulf (Cheesman 1920, Sanborn 1940, Harrison 1956b, Weber 1955, Hatt 1959, Al-Robaae 1966, 1968, Etemad 1967, Harrison 1972, DeBlase 1980, Nadachowski et al. 1990, Sachanowicz et al. 1999). Gaisler (1970) discussed possible presence of the latter form also in Afghanistan and concluded that his examined material from this country belonged to the Indian subspecies, *T. n. kachhensis*. However, later Gaisler (in Horáček et al. 2000: 104) mentioned that "it is not clear whether the Afghan specimens belong to *magnus* or to the Oriental *kachhensis*". Moreover, some Indian authors, like Sinha (1970, 1976) recognised two forms of the *nudiventris* group, *T. nudiventris* and *T. kachhensis* in western India.

As noted above, most authors have considered the Palestinian population of *T. nudiventris* to belong to the nominotypical subspecies (Kock 1969, Atallah 1977, Corbet 1978, Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999, Ferguson 2002, etc.). However, Harrison (1964a: 69) says: "Material seen from Palestine and south Arabia shows clear intermediation between *magnus* and typical *T. n. nudivetris*". A similar opinion was expressed also by Qumsiyeh (1985: 27)

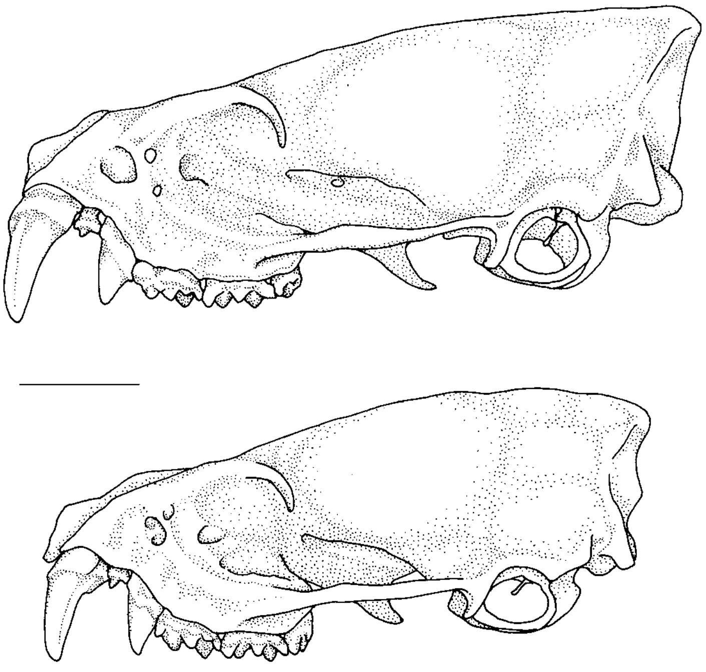

Fig. 19. Skulls of *Taphozous nudiventris magnus* von Wettstein, 1913 (above: female, NMP 48822, Syria, Khazneh) and *T. n. nudiventris* Cretzschmar, 1830 (below: female, NMP E5, Egypt, Abu Rawash). Scale bar = 5 mm.

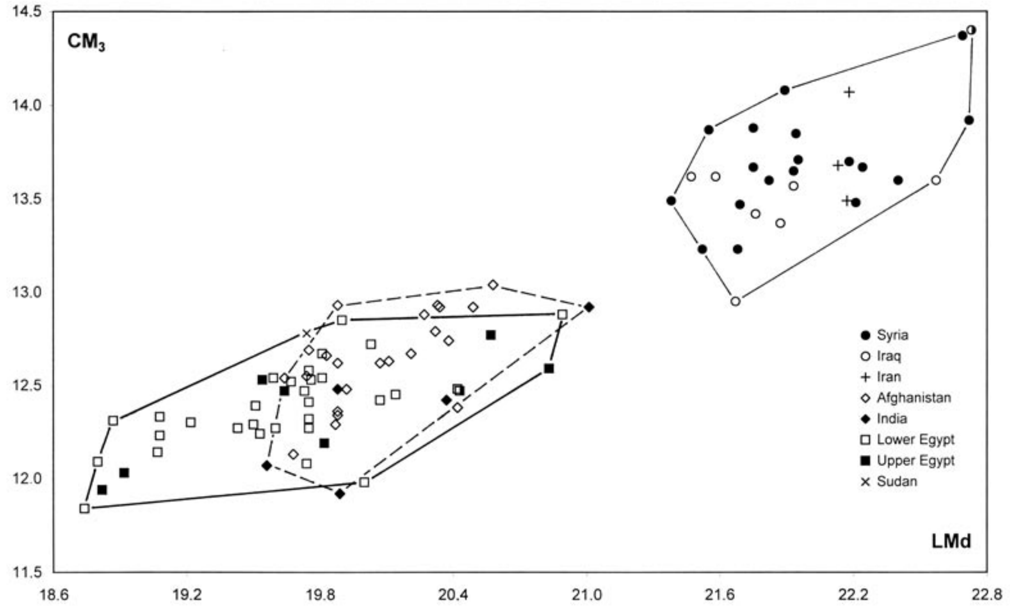

Fig. 20. Bivariate plot of examined Syrian and comparative samples of *Taphozous nudivetris*: length of mandible (LMd) against the length of lower tooth-row (CM_3). Explanation: thin-lined polygon = samples of *T. n. magnus* von Wettstein, 1913 (n=25); bold-lined polygon = samples of *T. n. nudiventris* Cretzschmar, 1830 (n=41); dashed polygon = samples of *T. n. kachhensis* Dobson, 1782 (n=27); half-filled circle = holotype of *T. magnus* von Wettstein, 1913, half-filled square = lectotype of *T. nudivetris* Cretzschmar, 1830.

who noted: "three available specimens from Mt. Karantal in Palestine are slightly larger than the average Egyptian specimens and may represent intergrades with *T. n. magnus* of Iraq". Thus, a question arises whether the population of *T. nudivetris* inhabiting Syria belongs to the large *T. n. magnus* known to occur in Iraqi Mesopotamia or to any intermediate form close to the smaller nominotypical subspecies.

According to a comparison of skull and external measurements (Table 4; Fig. 20) as well as a geographical proximity of the previously taxonomically well identified populations, the Syrian populations inhabiting the lowlands of the Euphrates and adjacent regions belong undoubtedly to the form *T. n. magnus*, which was previously noted already by Sachanowicz et al. (1999). The western part of the distribution range of this form comprises the whole Euphrates Valley from southeastern Turkey, through the eastern part of Syria to Iraq. Moreover, the metric data given by Harrison (1964a) and Mendelssohn & Yom-Tov (1999) clearly showed Palestinian populations to belong to the nominotypical subspecies, according to comparison with those in Table 4.

Harrison (1955) described his new subspecies *T. n. zayidi* on the basis of its ash grey dorsal pelage coloration which should differ from the brown one in the nominotypical form (he reported body size not to differ significantly between these two forms). The coloration of Syrian samples of *T. nudiventris* is greyish brown on the back and whitish on the ventral side (Fig. 21). This pattern was uniform in all compared samples of *T. n. magnus*, including also those from Iraq and Iran (see Appendix II). However, in our samples of *T. n. nudiventris* from Egypt, both greyish and brownish phases occur (Fig. 21). Also Harrison (1964a: 69) himself found one specimen from

Palestine to be grey and "rather closely resembling *T. n. zayidi*". In our samples of *T. n. kachhensis* from Afghanistan, greyish brown coloured individuals are present. This frequent variation in fur coloration implies that this feature does not probably have such important role for intraspecific taxonomy, as Harrison (1955) suggested.

Based on the limited data given by Harrison (1964a), Kock (1969) concluded that the individuals of *T. n. zayidi* from Oman were the smallest from all samples of *T. nudiventris* (although the size difference was not significant). However, he did not compare these data with those of the samples from the eastern part of the species range. In Pakistan, Gaisler (1970) found also very small individuals of *T. n. kachhensis*, while its Indian and Afghani specimens were slightly larger.

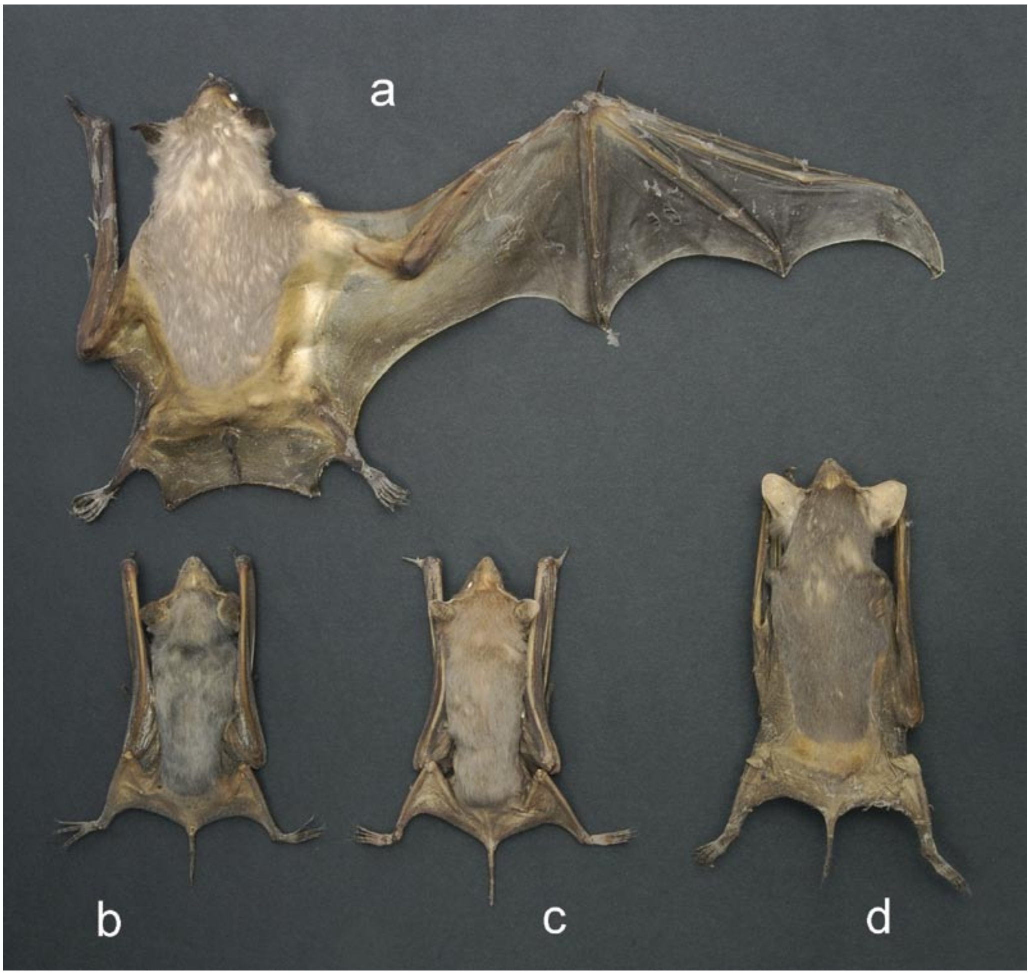

Fig. 21. Pelage coloration in *Taphozous nudiventris*: a – *T. n. magnus* von Wettstein, 1913 (female, NMP 48794, Syria, Halabiyyeh), b – *T. n. nudiventris* Cretzschmar, 1830 (sex undetermined, NMP E42, Egypt, Abu Rawash), c – *T. n. nudivetris* Cretzschmar, 1830 (sex undetermined, NMP E47, Egypt, Abu Rawash), d – *T. n. kachhensis* Dobson, 1872 (male, NMP AF941, Afghanistan, Chak-Naur). Part I. Dorsal aspect.

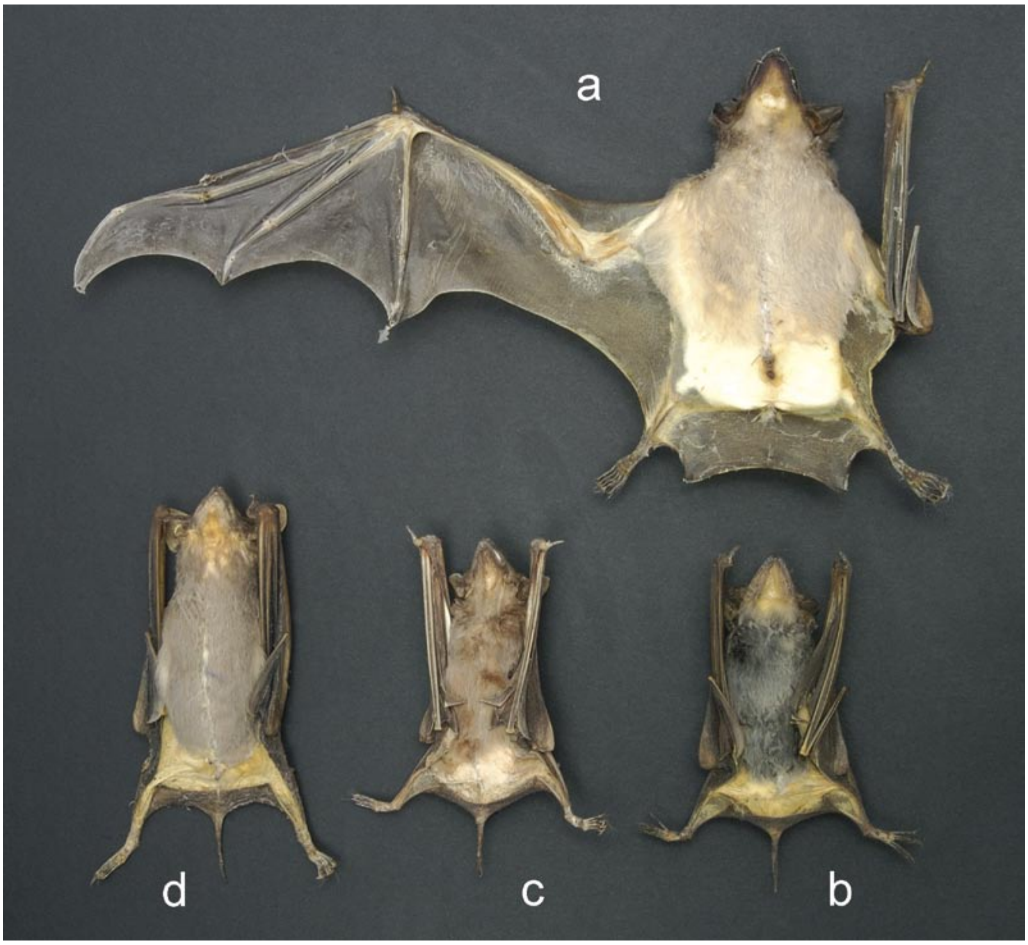

Fig. 21. (continued) Part II. Ventral aspect.

In our comparison (Fig. 20), the samples of *T. n. nudiventris* from Africa and of *T. n. kachhensis* from Afghanistan and India were of the same size ranges, although the larger sample of the nominotypical form showed wider variation and therefore smaller mean values than the Oriental subspecies. However, both these samples clearly differed from the individuals of *T. n. magnus* which are significantly larger and with only a slight overlap in almost all dimensions (see Fig. 19 and Table 4). These data could suggest that (1) in Afghanistan, there is *T. n. kachhensis* of the same size as in India and clearly different from *T. n. magnus* (contra Gaisler in Horáček et al. 2000); (2) the smallest individuals of *T. nudiventris* which inhabit adjacent areas in Oman and Pakistan should represent closely related forms, which could either be identified with the subspecies *T. n. zayidi*, but much more probably they are only cline size variations of the smaller subspecies, *T. n. nudiventris* (as they significantly do not differ from nominotypical and Oriental representatives, see Harrison 1964a and Gaisler 1970, respectively); (3) the intraspecific variation within *T.*

nudiventris is double categorial; individuals of one subspecies (*T. n. magnus*) differ in size much more than all other subspecies from each other, and the taxonomic differences among the smaller subspecies (*nudiventris*, *zayidi*, *kachhensis*, *nudaster*) are much more negligible and are based mostly on geographic reasons than on any substantial morphological differences.

Therefore, two possible taxonomic solutions of intraspecific variation indicated by these morphological observations are available; (1) species rank of *T. nudiventris* comprises only two subspecies, the smaller *T. n. nudiventris* with broad distribution from West Africa via East Africa, Egypt, western and southern Arabia, Pakistan and India, to Burma, and the larger *T. n. magnus* which occurs in a restricted range of Mesopotamia and adjacent areas; or (2) both these forms represent separate species, the monotypic and geographically restricted *T. magnus* and more variable and widely distributed *T. nudiventris*. The second possibility is supported by the character of distribution ranges of both possible species; although both forms are of parapatric distribution, no actual dimensional intermediation between these morphotypes is known both in northwestern and southeastern Arabia, i.e. between Syrian and Palestinian populations and Mesopotamian (Bahraini) and Omani populations, respectively, and the transition is of very sharp and deep step type. However, provided that the two forms represent separate species, these species are very close in their general characteristics, i.e. type of body hair distribution or skull constitution. As all these morphotypes live in parapatry without any known overlap of distribution ranges, the problem of their possible specific definition is a matter for genetic evaluation only.

FEEDING ECOLOGY. *Taphozous nudiventris* is a large fast flyer in open-air areas (Al-Robbae 1966, Neuweiler 1984). The most important diet items recorded by a previous analysis of a sample from the Persian Mesopotamia (Benda et al. 1999b) were the representatives of Scarabaeidae, Orthoptera and Odonata. We analysed three samples of faeces of *T. nudiventris* from Syria, in which Coleoptera (mostly Scarabaeidae and Carabidae) and Orthoptera (Fig. 22) were the most

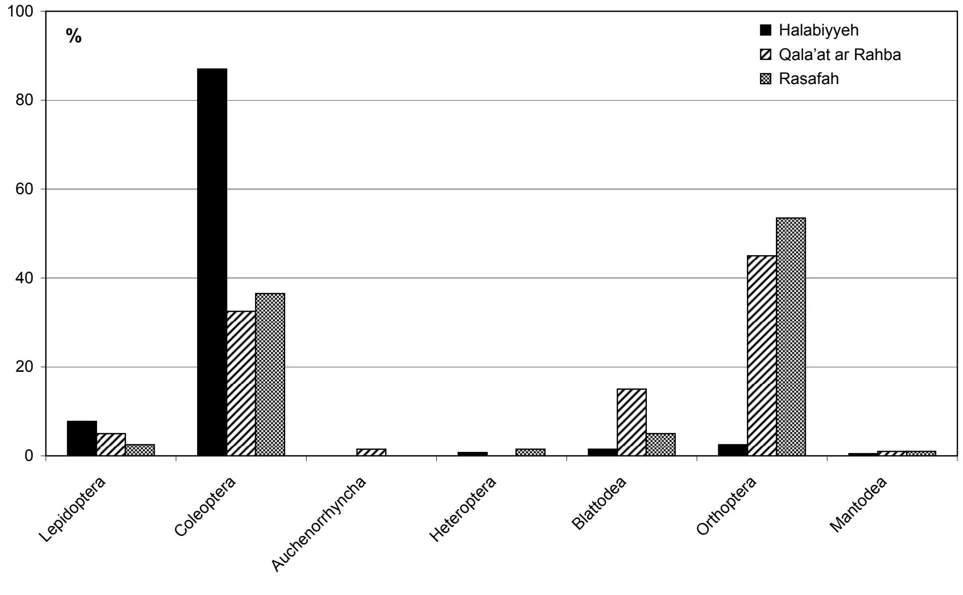

Fig. 22. Volume of particular food items in the diet of *Taphozous nudiventris* Cretzschmar, 1830, from Syria.

important prey categories. Results obtained by the analysis of digestive tracts of Syrian bats were quite similar to faeces analysis, except for the material collected at Ayyash. In this sample, Lepidoptera were the prevailing food items (60% of volume), the rest was composed of Scarabaeidae (20%), Orthoptera (10%), Heteroptera (5%), and Isoptera (5%).

Rhinolophus ferrumequinum (Schreber, 1774)

Records. **Original data**: Al Lathiqiyeh: Amwd [1], small cave, 15 May 2001: obs. 1 faG; – Al Lathiqiyeh [2], 1900: 1 ma (specimen in MNHN); – Qala'at Salah ad Din, castle ruins [3], 30 June 1998: obs. several inds. (coll. 1 ma, 1 fa); 13 October 2004: obs. signs of a large colony (coll. two cadavers); – Qala'at Salah ad Din, small cave in a gorge under the castle [4], 30 June 1998: obs. 1 ind.; 13 October 2004: det. several inds.; – Ar Rawda near Rabi'ah [5], water pool, 1 July 1998: det. 1 ind. – Deir ez Zur: As Salihiyyah, ruins of ancient Dura Europos [6], 19 April 2001: 2 inds. from *Tyto alba* pellets; ancient Dura Europos, gallery, 18 June 1998: net. 1 ma; 16 May 2001: coll. 1 ma; – As Salihiyyah, valley 1.5 km NW of Dura Europos [7], cave, 20 April 2001: net. 2 ma, 1 fa, 2 faG. – Der'a: Bosra [8], citadel ruins, 25 May 2001: obs. colony of ca. 50 ad. inds. (coll. 4 faG, 1 fa p.p., 1 mj). – Hama: Qala'at Sheisar [9], castle ruins, 1 July 1998: obs. nurs. colony of ca. 100 ad. inds. (coll. 6 fa, 1 fj); 31 May 2001: 1 fa (mummy). – Halab: Qala'at Najm [10], cellar in castle ruins, 10 May 2001: obs. colony of ca. 25 ad. inds. (coll. 1 ma, 5 faG); – Qala'at Samaan [11], Byzantine ruins, 3 June 2001: obs. colony of ca. 20 ad. inds. (coll. 1 faL, 2 fs, 1 fj); – Qatura [12], necropolis, 2 June 2001: net. 1 fs, 1 faG. – Homs: Qala'at al Hosn [13], ruins of Krak des Chevaliers, castle cellar, 15 June 1997: obs. colony of 10 inds.; 28 June 1998: obs. 2 inds.; 29 May 2001: obs. 1 ind.; 18 October 2004: obs. 19 inds., net. 1 fa. – Tartus: Qala'at al Marqab [14], castle ruins, 16 October 2004: obs. 3 inds. (exam. 1 ma). – Quneitra / Golan Heights: Gamla [15], excavations of ancient town, cistern, 19 July 1999: obs. 1 ind.; – Qala'at Nimrud [16], cellar in castle ruins, 18 July 1999: coll. 1 ma. – **Published data**: Halab: Qala'at Najm [10], cellar in castle ruins, 29 March 1836: obs. colony, coll. 3 fa (Nostitz 1873, Dobson 1878, Ainsworth 1838, 1888). – Raqqa: Cater (= Qatr) Magara cave [17], 1993: 2 inds. (in osteological cave deposit), 1994: obs. 9 inds. torpid (Ebenau 1994, 1996); – Raqqa, 'Taubenbrunnen' cave [18], 1993: 1 ind. (in osteological cave deposit) (Ebenau 1994, 1996). – Quneitra / Golan Heights: Golan Heights and Mount Hermon, seven unidentified records mapped in all parts of the region (Mendelssohn & Yom-Tov 1999).

Possible records (Syria *sensu lato*). **Published data**: Syrien (Peters 1871). – Syria (Dobson 1876). – Syria, 2 inds. ad. (Dobson 1878, Andersen 1905a). – Syrien, 1 ind., [ded.] Dr. Rey in Leipzig (Nehring 1886). – Syrie, 1878: 1 ind. ad. (Jentink 1888). – Lake of Galilee, 2 fa, leg. Canon Tristram (Dobson 1878) = Galilee (Andersen 1905a). – Euphrates valley, 3 fa, leg. Col. Chesney (Dobson 1878, Andersen 1905a; but see Nostitz 1873, Ainsworth 1838, 1888 and above [10]).

Distribution. **General**. *Rhinolophus ferrumequinum* is a South Palaearctic faunal element with broad distribution in the temperate zone of the Palaearctic from the Maghreb, southern Britain and western Europe, over Central Europe, the northern Mediterranean (incl. most islands), the Caucasus Region and the Near East, Central Asia and northern India to southern China and Japan (Corbet 1978, Koopman 1994, Horáček et al. 2000, Gaisler 2001a, Csorba et al. 2003).

Near East. In the Near East, *R. ferrumequinum* is distributed mainly in the Mediterranean habitats of Turkey, Cyprus, Syria, Lebanon, Jordan, and Palestine, where it is one of the most common species (Harrison & Bates 1991, Benda & Horáček 1998, Mendelssohn & Yom-Tov 1999). However, it occurs also in Mesopotamia from Turkey to Iran (von Lehmann 1969, DeBlase 1980, Nader & Kock 1983c, Albayrak 1990a). In the Near East as well as in the Maghreb, *R. ferrumequinum* reaches southern margins of its distribution range.

R. ferrumequinum is a widespread species in Turkey, where it is known from almost all biogeographic units (Benda & Horáček 1998); it is the most frequently recorded species in this country, in its Mediterranean coast, montane as well as in arid parts (Doria 1887, Şadoğlu 1953, Strinati 1959, Kahmann & Çağlar 1960, Osborn 1963, von Lehmann 1966, 1969, Çağlar 1965, Corbet & Morris 1967, DeBlase & Martin 1973, Kock 1974, Kumerloeve 1975a, Felten et al. 1977, Nader & Kock 1983c, von Helversen 1989, Albayrak 1990a, 1993a, 2003, Obuch 1994, Steiner & Gaisler 1994, Hasbenli 1997, Benda & Horáček 1998, Özgül et al. 2000, Furman & Özgül 2002, Karataş et al. 2006, Yiğit et al. 2006, our unpubl. data). This bat has also been commonly found in the Turkish regions adjacent to the Syrian border; its records come both from Mediterranean Hatay (Şadoğlu

1953, Kahmann & Çağlar 1960, Theodor 1967, Albayrak 1990a, Felten et al. 1977, Benda 1996) and from steppe Turkish Upper Mesopotamia (von Lehmann 1969, Albayrak 1990a).

R. ferrumequinum is one of the most commonly found bats in Lebanon, its records are known from coastal regions, from the Lebanon Mts as well as from the Bekaa Valley (Kolenati 1856a, b, Jentink 1887, 1888, Harrison 1964a, 1972, Atallah 1970, Tohmé & Tohmé 1985). In Palestine, this bat occurs throughout the Mediterranean northern half of the country, from the Judean Hills and central part of the Coastal Plains (incl.) to the north (Tristram 1866, 1884, Festa 1894, Andersen 1905a, Bodenheimer 1935, 1958, Harrison 1964a, Theodor 1967, Felten et al. 1977, Makin 1977, 1987, Makin & Mendelssohn 1985, Mendelssohn & Yom-Tov 1999, Ferguson 2002). It lives also in the Hula Valley (Harrison 1964a, Mendelssohn & Yom-Tov 1999). In Jordan, *R. ferrumequinum* has been recorded in the northwestern part of the country only, in Mediterranean habitats adjacent to the Jordan Valley and the Dead Sea (Harrison 1959, Felten et al. 1977, Qumsiyeh et al. 1986, Harrison & Bates 1991, Qumsiyeh 1996).

In lower Mesopotamia, the most records of *R. ferrumequinum* come from its northern border and from the southern slopes of the Zagros Mts, respectively, both in Iraq and Iran (Harrison 1964a, DeBlase 1980, Nader & Kock 1983c, cf. Al-Robbae 1976). However, at least one finding was made also in true desert areas of the Syrian Desert in western Iraq (Niazi 1976). In western Iran, however, this bat is widespread over humid mountains as well as dry lowlands (Cheesman 1921, Etemad 1967, Lay 1967, DeBlase 1980, our unpubl. records).

R. ferrumequinum is known to occur also in Cyprus, where it was found several times (Bate 1903, Andersen 1905a, Boye et al. 1990, our unpubl. data).

Syria (Fig. 23). *R. ferrumequinum* is a common bat in Syria, 25 records are available from various parts of the country (Table 1). According to these records, it is the second most frequent bat species in the country. This species inhabits two different regions in Syria. It is widely distributed in the western part of the country where it occupies mostly Mediterranean woodlands [1–5, 11–16] and also suitable habitats in the intermediate zone [8, 9] between the Mediterranean region and the Syrian Desert, the Mediterranean steppe-maquis (cf. Zohary 1973). The apparent gap in the Levantine distribution of this bat, formerly reported to exist along the Syrian portion of the Mediterranean coast between its ranges in Lebanon and Turkish Hatay (see e.g. Harrison & Bates 1991), is now filled up by numerous new records from the Jebel An Nusariyah Mts and along the Levantine coast. The records from northwestern Syria [11, 12] closely connect the rather frequent distribution of this species in Hatay (see above). *R. ferrumequinum* is a common bat in the Golan Heights (Mendelssohn & Yom-Tov 1999, our records). The record from foothills of the Jebel Al Arab [8] seems to be rather isolated, however this spot of occurrence well connects the records in northwestern Jordan (Harrison 1959, Qumsiyeh et al. 1986, 1998).

The other area of *R. ferrumequinum* occurrence in Syria lies along the Euphrates [6, 7, 10, 17, 18]; this area is a part of the semi-desert region of Syria – the Mesopotamian steppes (Zohary 1973). This peculiar part of the distribution range in eastern Syria and western Iraq (Niazi 1976) connects occurrence of this species in more humid steppes of Turkish and Iraqi Mesopotamia (see above) and indicates a good adaptability of this species to drier habitats. However, *R. ferrumequinum* does not occur more to the south, in the Syrian and Great Sandy Deserts of northern and central Arabia (Harrison & Bates 1991), where its possible vicariant form, *R. clivosus* Cretzschmar, 1828, is found. In the Euphrates Valley of Syria, nevertheless, *R. ferrumequinum* is only an accesory faunal element; the true desert bat species are more common there (*T. nudiventris*, *A. tridens*, *E. bottae*, *O. hemprichii*).

Harrison (1964a) and Harrison & Bates (1991) mentioned two BMNH specimens of *R. ferrumequinum* labelled 'Tripoli, Syria' as a Syrian record. However, these individuals come most probably from Tripoli (= Trablous) in Lebanon (Atallah 1977, Tohmé & Tohmé 1985). In Syria *sensu stricto*, the place named 'Tripoli' does not exist. The first undoubted record of this bat from Syria comes from the upper part of the Euphrates Valley near Raqqa (Ebenau 1994, 1996). However, some authors (Fitzinger 1870a, Tristram 1884, Trouessart 1897, Peters 1871, Palacký 1902, Ryberg 1947, Ellerman & Morrison-Scott 1951, Gaisler 2001a, etc.) mentioned Syria as a part of *R. ferrumequinum* distribution range.

Dobson (1878) and Andersen (1905a) mentioned three BMNH female specimens of *R. ferrumequinum* labelled 'Euphrates valley, Col. Chesney [C]'. These specimens were collected in 1836 during the 'Expedition to the Euphrates' under the command of Sir George Chesney and in 1850 presented to BMNH (Thomas 1906). The unclear origin of these individuals was probably clarified by Nostitz (1873) and Ainsworth (1888), respectively (see under *T. nudiventris* for the Expedition details). During a visit of the castle 'Schloss Kalaat-en-Nedschm' [= Qala'at Najm] on 29 March 1836, the Expedition members found that: "Eine unglaubliche Menge großer Fledermäuse (*Rhinolophus*) bewohnt diese Gewölbe. Sie löschten alle Augenblicke das Licht aus, umschwirrten unsere Kopfe und versetzten uns ins Gesicht fahrend recht derbe Ohrfeigen. Von ihrer ungeheuern Anzahl geben ihre Excremente einen Begriff, die stellenweise fünf Schuh hoch liegen [...]." (Nostitz 1873: 202–203). Moreover, the episode was described similarly by Ainsworth (1838, 1888); he mentioned (Ainsworth 1838: 37): "Castle of Stars on Euphrates, *Rhinolophus* sp." Later, Ainsworth (1888: 231–232) wrote: "the vaults [of Nesjm Kalah or 'Castle of the Stars' = Qala'at Najm] were so full of large bats (*Rhinolophus*), that as often as we introduced a light,

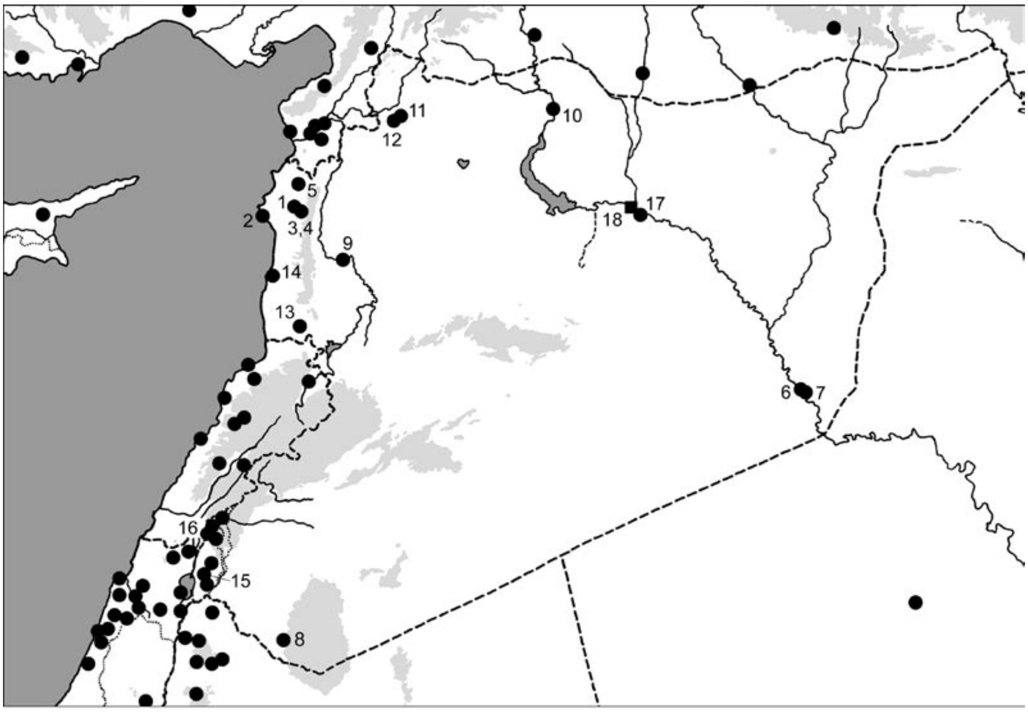

Fig. 23. Records of *Rhinolophus ferrumequinum* (Schreber, 1774) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

they extinguished it by their numbers". As it was pointed out above, the Euphrates Expedition under Chesney's command sustained an accident when the collection specimens and data were lost (Nostitz 1873, Ainsworth 1888, Shehab et al. 2004), but the material from the Birecik–Balis route. During our visit of ruins of the Qala'at Najm Castle in May 2001, we also found there a colony of 'big horse-shoe bats', i.e. of *Rhinolophus ferrumequinum*, although the colony had only ca. 25 individuals. The accurate locality of the specimens from 'Euphrates valley' given by Dobson (1878) seems to be clear, it is most probably the Qala'at Najm Castle. This statement might be confirmed by our record of the *R. ferrumequinum* colony in this castle.

FIELD NOTES. In Syria, *Rhinolophus ferrumequinum* was most often found in historical buildings and ruins. The largest colony of this species recorded in Syria contained ca. 100 individuals. It was localised in a dark ground-floor room of the deserted castle of Qala'at Sheisar on 1 July 1998 (Fig. 24), while during another visit of the ruins on 31 May 2001, no colony was found in the area, only a mummy of an adult female. In the citadel of Bosra, a colony of ca. 50 adult individuals was recorded in a dark room under a theatre auditorium. In the cellar of the ruined castle of Qala'at Najm, a colony of ca. 25 adult individuals was observed. In the ruins of the Byzantine castle of Qala'at Samaan, a colony of ca. 20 adult individuals roosted in a partly lightened basement room. In the ruined castle of Qala'at Salah ad Din (Fig. 40), a small group of adults was observed on 30 June 1998, while during a second visit of these ruins on 13 October 2004 remains and signs of a large colony were found, including some cadavers of adult bats. Individuals of *R. ferrumequinum* were observed during repeated visits of the monumental castle of Krak des Chevaliers (Qala'at al Hosn; Fig. 8), however, the colony was found only in some years. A smaller colony of ca. 10 individuals was present in the castle stables on 15 June 1997, a year later, on 28 June 1998, two adult individuals were observed roosting in the same room, while only one individual was found there on 29 May 2001, but on 18 October 2004 a group of 19 individuals was recorded in the castle.

In other abandoned living places, solely roosting individuals of *R. ferrumequinum* were documented. A solitary adult male was collected in the ca. 50 m long corridor of a mine/excavation in the deserted ancient town of Dura Europos (As Salihiyyah) (Figs. 25–27). A torpid adult male was found in the dark underground room (? Guest Quarters according to Jacobs 1998) of the castle of Qala'at Nimrud (Fig. 11). In an empty cistern in the excavation area of Gamla, Golan Heights, an active individual was observed. In the castle of Qala'at al Marqab three individuals were found (an adult male examined, with LAt of 55.6 mm). Inartificial roosting sites of *R. ferrumequinum* in Syria included small caves, one in a canyon below the ruins of Qala'at Salah ad Din and another one at Amwd close to Qala'at Salah ad Din. Additionally, Ebenau (1994, 1996) reported an observation of nine individuals roosting in the spacious Qatr Magara cave (Fig. 18). Altogether, 71.4% of the roosts of *R. ferrumequinum* in Syria were found in artificial shelters, while 28.6% of the roosts were situated in natural caverns. In any case, all known shelters were dark, rocky or stone, mostly underground spaces and no tendency to use attics or similar man-made alternatives has been recorded.

R. ferrumequinum was netted in Syria only exceptionally in comparison with the number of roosting sites recorded; at As Salihiyyah it was netted at two places, at the entrance to the underground corridor in the excavation area of Dura Europos (where an individual was found roosting during another visit) and at the entrance of a small cave ca. 1.5 km northwest of these ruins. Two more individuals were netted at a tomb opening in the necropolis of Qatura. One adult female was netted under a bridge span at Krak des Chevaliers (Qala'at al Hosn). Using a bat detector, foraging individuals were recorded also only exceptionally, at two places, in a canyon below the ruins of Qala'at Salah ad Din and in a pine forest at Ar Rawda during a netting session at an irrigation reservoir.

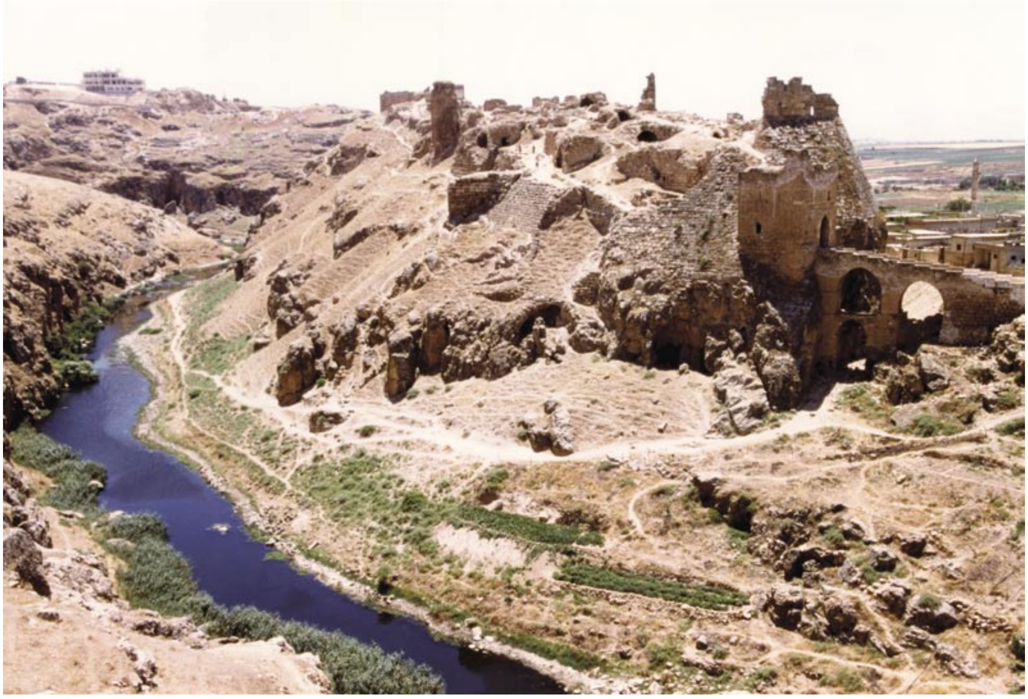

Fig. 24. Ruins of the crusader castle of Qala'at Sheisar above the Orontes river. In the ruins, a colony of *Rhinolophus ferrumequinum* and individuals of *Eptesicus anatolicus* and *Hypsugo savii* were found. The colony of *R. ferrumequinum* of ca. 100 individuals roosted in ground rooms just above the river, in the centre of the picture (photo by M. Kaftan).

As *R. ferrumequinum* was recorded in most landscape types of Syria, it was found syntopically with a large part of the bat fauna of the country. In the ruins of the Byzantine castle of Qala'at Samaan it was found to occupy a basement room neighbouring with that inhabited by a colony of *M. emarginatus*. In the castle ruins of Qala'at Salah ad Din and in its surroundings, *R. ferrumequinum* was recorded along with *R. hipposideros*, *R. euryale*, *M. nattereri*, *M. emarginatus*, and *P. kuhlii*. Except for the latter one, all these species created colonies there, *R. euryale* shared the same room (basement of the Tower). A similar number of syntopic species was recorded in and at the castle of Krak des Chevaliers, namely *R. aegyptiacus*, *R. hipposideros*, *M. myotis*, *M. blythii*, *P. pipistrellus*, *P. kuhlii*, *M. schreibersii*, and *T. teniotis*. At Qala'at Sheisar, it was found together with *E. anatolicus* and *H. savii*. The Qala'at Nimrud castle hosted also *M. blythii* and a colony of *R. hardwickii*. During the visit of the castle of Qala'at al Marqab on 16 October 2004, calls of *P. kuhlii* and *T. teniotis* were detected together with a finding of *R. ferrumequinum*. In Qala'at Najm, individuals of *P. kuhlii* were found to roost jointly with a colony of *R. ferrumequinum*. In the area of As Salihiyyah, a roosting individual of *E. bottae* was also collected. However, except for Qala'at Salah ad Din and Krak des Chevaliers, where *R. ferrumequinum* was found together with *R. euryale* or *R. hipposideros*, respectively, it did not occupy the same rooms with other bat species.

Common foraging of *R. ferrumequinum* with *P. pipistrellus*, with *E. bottae*, and with *H. savii* and *P. kuhlii* was recorded by netting at Ar Rawda, As Salihiyyah, and at Qatura, respectively.

On 20 April 2001, two pregnant females were netted near As Salihiyyah, both containing one foetus of crown-rump length of 13.2 mm. On 10 May 2001, five pregnant females were collected in the castle ruins of Qala'at Najm, each of them contained one foetus; their crown-rump length varied from 14.0 to 30.6 mm (mean 22.9 mm). On 25 May 2001, in the citadel ruins of Bosra, four pregnant females were collected with four foeti of the crown-rump length varying from 24.0 to 33.5 mm (mean 29.3), and a post-partum female with a small juvenile male of LAt of 25.7 mm (= 43.7% of the mean from adults). On 3 June 2001, one lactating female with a juvenile female of LAt of 36.0 mm (= 61.3% of the mean from adults) was taken from the colony found in the ruins of Qala'at Samaan. On 1 July 1998, a juvenile female of LAt of 43.0 mm (= 73.2% of the mean from adults) was collected along with adults from the large colony in Qala'at Sheisar. These data suggest timing of births in *R. ferrumequinum* in Syria in the last decade of May and/or first days of June, similarly as Atallah (1977) gave for populations of the southern Levant and a month earlier than it is known from the European range of the species (Gaisler 2001a). Mendelssohn & Yom-Tov (1999) reported births in the Golan populations to occur in May–June, i.e. perhaps very similarly to other populations of Syria.

R. ferrumequinum was found in owl diet from only one site in Syria, in the pellets of *Tyto alba* collected at As Salihiyyah (our data, Table 35), while in the diet of other owls it was not recorded. Its remains represented 0.06% of all prey items of the barn owl diet from As Salihiyyah (0.07% of mammalian and 0.18% of bat items) and 0.01% of all prey items of all samples of the barn owl

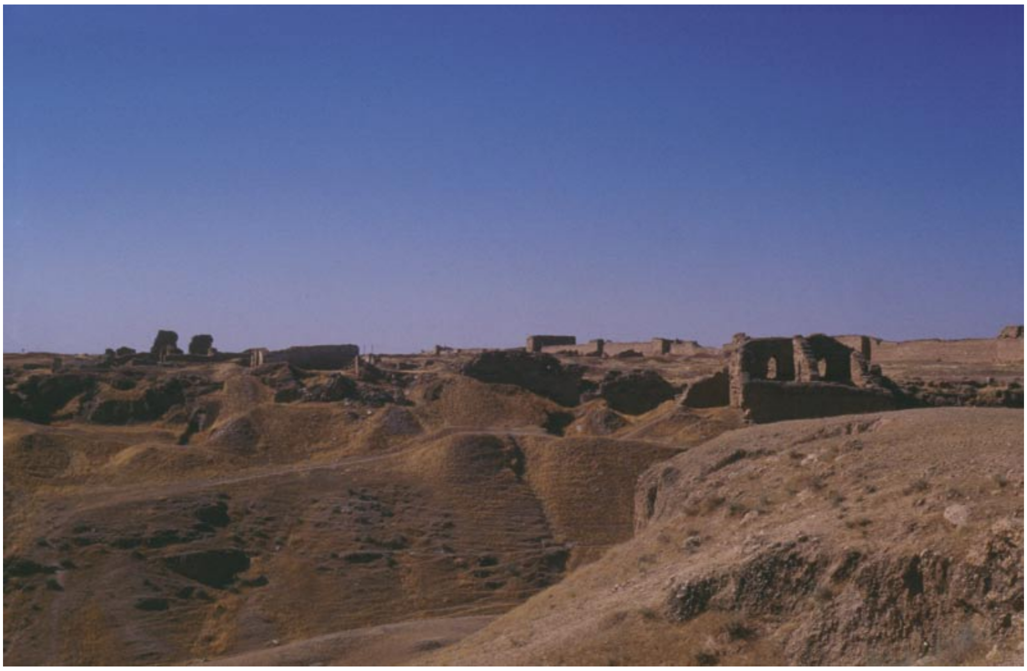

Fig. 25. Ruins of ancient Dura Europos at As Salihiyyah. These ruins, located on the cliff above Euphrates river (Fig. 26) and surrounded by soil semi-desert, hosted *Rhinolophus ferrumequinum*, *Eptesicus bottae* and *Pipistrellus kuhlii*, other species (*Taphozous nudiventris*, *Asellia tridens*, *Myotis capaccinii*, *Eptesicus serotinus*, *Otonycteris hemprichii*) were detected in pellets of *Tyto alba* throughout the ruins (photo by P. Benda).

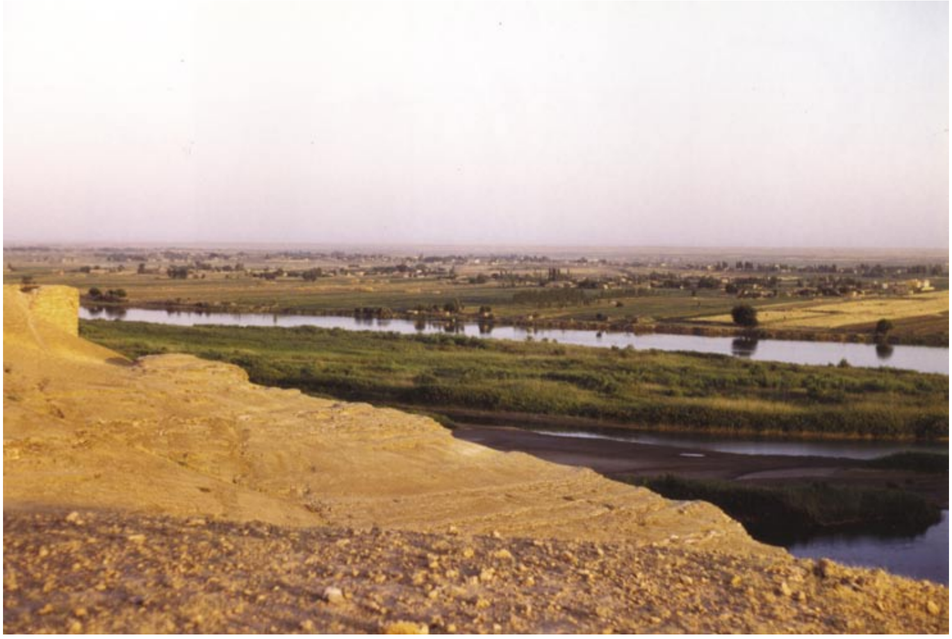

Fig. 26. Position of the ruins of Dura Europos above the fertile alluvial plain of the Euphrates river (photo by P. Benda).

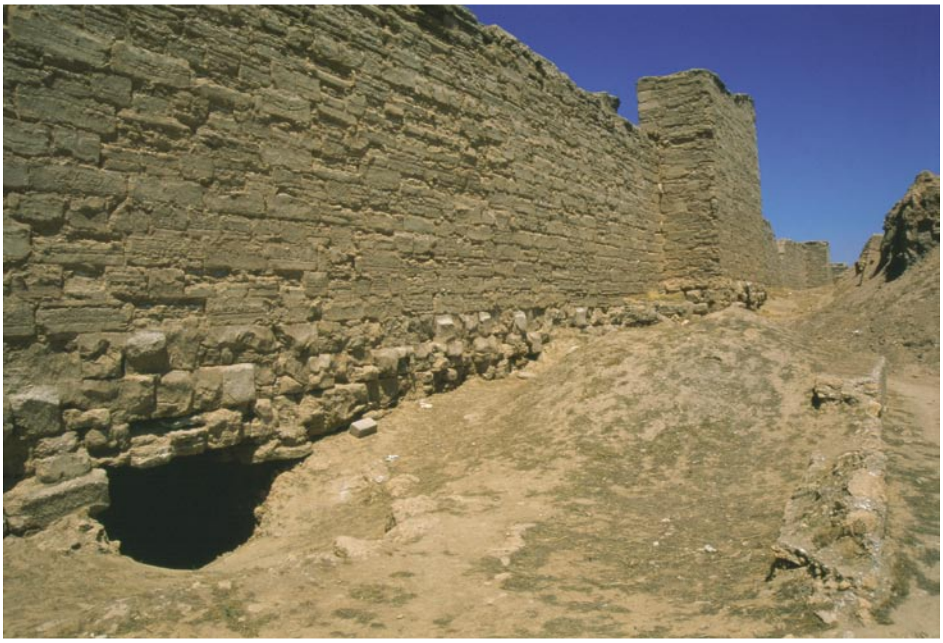

Fig. 27. Entrance of a gallery or excavation corridor (ca. 50 m long) under the city wall of the ancient Dura Europos; the occurrence site of solitary individuals of *Rhinolophus ferrumequinum* and *Eptesicus bottae* (photo by A. Reiter).

diet from Syria (and 0.01% of mammalian and 0.10% of bat items) – see Table 35. The remains of *R. ferrumequinum* were found also in the diet of *Strix aluco* in Turkey (Obuch 1994) and at several sites in the diet of *Bubo bubo* in Iran (Obuch unpubl.).

Material examined. 1 ma (NMP 48030 [S+A]), As Salihiyyah, 18 June 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 1 ma (NMP 48804 [S+A]), As Salihiyyah, 16 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 inds. (NMP 90358; 1 rostrum, pair of maxillae, pair of mandibles, from owl pellets), As Salihiyyah, 19 April 2001, leg. J. Obuch; – 2 ma, 3 fa (NMP 48975–48978 [S+A], 48974 [S+B]), 1 km NW of As Salihiyyah, 20 April 2001, leg. P. Munclinger & P. Nová; – 5 fa, 1 mj (NMP 48854–48858 [S+A], 48859 [A]), Bosra, 25 May 2001, leg. M. Andreas, P. Benda & D. Weinfurtová; – 1 ma (MNHN 1983-1958 [S+A]), Lattakié (= Al Lathiqiyeh), 1900, leg. H. Gadeau de Kerville; – 1 ma, 5 fa (NMP 48759–48764 [S+A]), Qala'at Najm, 10 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma (NMP 48270 [S+A]), Qala'at Nimrud, 18 July 1999, leg. P. Benda; – 1 ma, 1 fa (NMP 48073, 48074 [S+A]), Qala'at Salah ad Din, 30 June 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 1 ind. (NMP 90342 [S]), Qala'at Salah ad Din, 13 October 2004, leg. R. Lučan; – 1 fa, 2 fs, 1 fj (NMP 48935, 48936 [S+A], 48937 [S+B], 48938 [A]), Qala'at Samaan, 3 June 2001, leg. M. Andreas, A. Reiter & D. Weinfurtová; – 6 fa, 1 fj (NMP 48077–48082 [S+A], 48083 [A]), Qala'at Sheisar, 1 July 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 1 fa (NMP 48892 [S+A]), Qala'at Sheisar, 31 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 fs, 1 fa (NMP 48927, 48928 [S+A]), Qatura, 2 June 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – Syrien, 1 fa (ZMB 555 [A], labelled '*Rhinolophus conchifer*'), leg. [F. W.] Hemprich & [C. G.] Ehrenberg.

Morphology. See Table 5 and Appendix III for biometric data on the Syrian specimens of *Rhinolophus ferrumequinum*. Skulls of two specimens from different parts of Syria are shown in Fig. 28, the noseleaf of an individual from the semi-desert part of Syria is depicted in Figs. 29 and 30.

Taxonomy. *Rhinolophus ferrumequinum* is considered to be a polytypic species (Andersen 1905a, b, Ognev 1928, Ryberg 1947, Ellerman & Morrison-Scott 1951, Sinha 1973, Felten et al. 1977, Corbet 1978, Koopman 1994, Horáček et al. 2000, Gaisler 2001a, Csorba et al. 2003, Simmons 2005). Seven subspecies are currently recognised in its distribution range (Csorba et al. 2003, Simmons 2005), viz. *R. f. ferrumequinum* (Schreber, 1774) (terra typica: France), *R. f. nippon* Temminck, 1835 (t.t.: Japan), *R. f. tragatus* Hodgson, 1835 (t.t.: Nepal), *R. f. proximus* Andersen, 1905 (t.t.: Gilgit, Kashmir), *R. f. korai* Kuroda, 1938 (t.t.: Shuronmen, Seisu-gun, Keisho-hukudo, [South] Korea), *R. f. irani* Cheesman, 1921 (t.t.: Shiraz, alt. 5,200', Persia [Iran]), and *R. f. creticus* Iliopoulou-Georgudaki et Ondrias, 1986 (t.t.: Cave 'Milatos', Lasithi, Crete [Greece]).

Two subspecies have been reported to occur in the Middle East* (Harrison 1964a, Corbet 1978, DeBlase 1980, Harrison & Bates 1991, Csorba et al. 2003), *R. f. ferrumequinum* in the western part, including the Levant (Bodenheimer 1958, Lewis & Harrison 1962, Kumerloeve 1975a, b, Atallah 1977, Felten et al. 1977, Steiner & Gaisler 1994, Mendelssohn & Yom-Tov 1999, Ferguson 2002), and *R. f. irani* in the eastern parts from Iraq to Afghanistan (Aellen 1959, Mirza 1965, Etemad 1967, Gaisler 1970, Nader & Kock 1983c, Corbet & Hill 1992). A third name, which could pertain to the populations of the Near East, *R. ferrum-equinum colchicus* Satunin', 1912 (t.t.: large caves of Abkhazia [NW Georgia]) is rather considered to be a synonym of the nominotypical form (Bianki 1917, Ognev 1928, Kuzjakin 1950, 1965, Ellerman & Morrison-Scott 1951, Corbet 1978, Csorba et al. 2003, etc.) than a designation of a separate subspecies (Satunin' 1914, Strelkov 1963).

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* Note. Peters (1871: 310) described the distribution of *R. ferrumequinum* as follows: "In Europa, Nordafrika, Vorderasien, Syrien (*Rh. libanoticus*, *conchifer* et *rufescens* Ehrbg. et Lichtst. Mspt.)". Some of the latter names could be related to a material coming from Syria of the present days (see the Material examined) as C. G. Ehrenberg and F. W. Hemprich collected animals during their journey concerning northeastern and eastern Africa and the Midde East (see e.g. Ehrenberg 1828). However, these bats might originated rather in the modern Lebanon, in an area bordered by cities of Beirut, Baalbek and Tripoli (see e.g., Stresemann 1962, Klausewicz 2002). Andersen (1905a) mentioned these names among synonyms of his *R. ferrum-equinum typicus* (= *R. f. ferrumequinum*). However, all these names are apparently nomina nuda (Andersen 1905a).

Several authors suggested the name *R. f. irani* to be a junior synonym of *R. f. proximus* (Kuzjakin 1950, Chakraborty 1977, Koopman 1994), see Csorba et al. (2003) for a review. Differences between the forms *irani* and *proximus* have not been precisely defined and thus, these forms may be just colour morphs of one subspecies (see Meyer-Oehme 1965, Gaisler 1970, Sinha 1973, Chakraborty 1977, Felten et al. 1977, Strelkov et al. 1978, DeBlase 1980, Rakhmatulina 1988, Horáček et al. 2000, etc.). However, Csorba et al. (2003) considered both forms as valid subspecies (see above), based on unpublished results of a statistical analysis (Thomas 1997), but they did not give any data to support this view. Here, we keep the final definition of these forms as well as their possible synonymy open and discuss only the situation concerning the Near East *proper*, similarly as DeBlase (1980) or Nader & Kock (1983c) did.

DeBlase (1980) examined the type specimen of *R. f. irani* and a series of *R. ferrumequinum* from a broad area of southwestern Asia. He found all Persian samples to belong to *R. f. irani*, including those coming from the westernmost parts of Iran. He assigned all his bats from Turkey and from the Levant to the nominotypical subspecies (similarly as Felten et al. 1977). Skull size was mentioned by DeBlase (1980) as the main discrimination criterion between the two subspecies, being larger in *R. f. ferrumequinum*, LCc 20.9–21.8 mm (mean 21.4 mm from 27 Levantine and Turkish bats), and smaller in *R. f. irani*, LCc 19.8–20.9 mm (mean 20.3 mm from 23 Persian bats). According to this comparison, he designated the range of the latter subspecies as: "Iraqi Kurdistan,

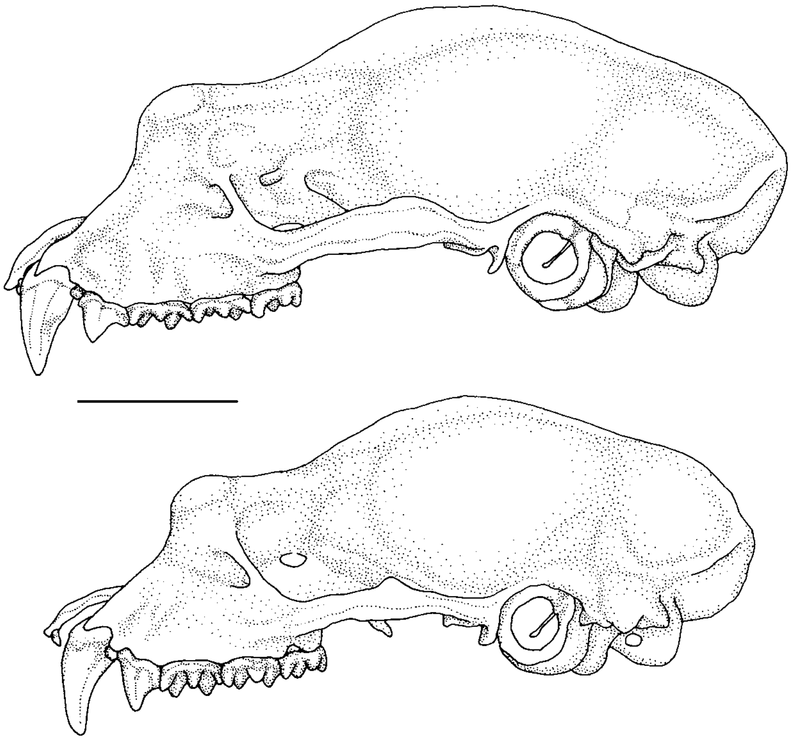
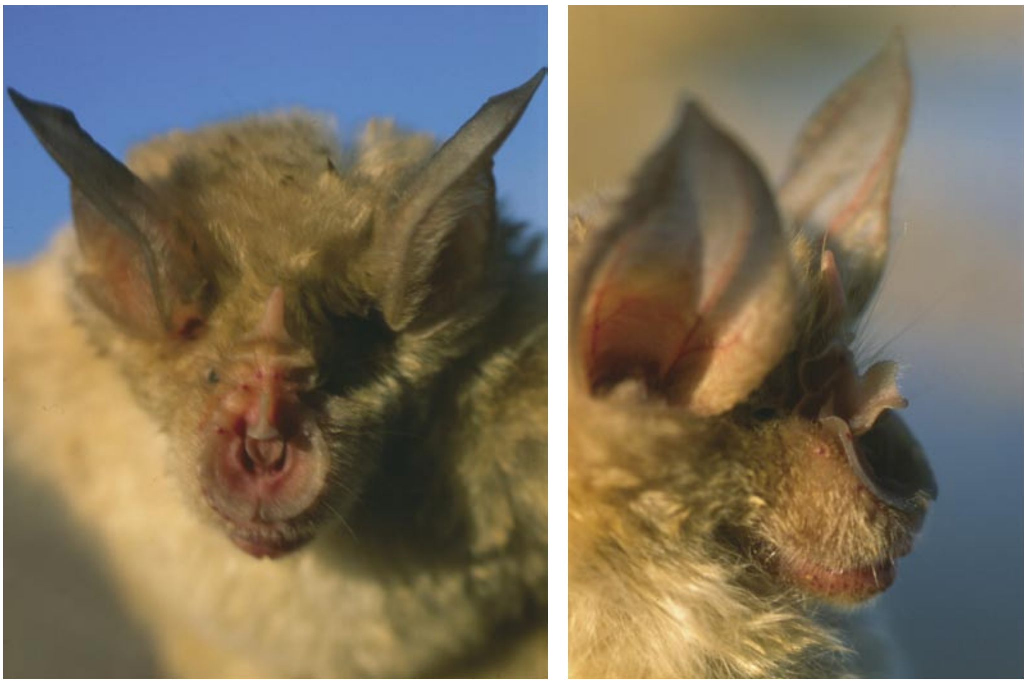


Fig. 28. Skulls of *Rhinolophus ferrumequinum ferrumequinum* (Schreber, 1774) (above: male, NMP 48073, Syria, Qala'at Salah ad Din) and *R. f. irani* Cheesman, 1921 (below: male, NMP 48975, Syria, As Salihiyyah). Scale bar = 5 mm.



Figs. 29, 30. Portraits of *Rhinolophus ferrumequinum irani* Cheesman, 1921 from Dura Europos (As Salihiyyah). 29 (left) – overall look on the face and noseleaf. 30 (right) – semi-lateral view on the sella and the noseleaf (photo by A. Reiter).

eastern Turkey(?), eastern Transcaucasia, Iran, Turkmeniya, Uzbekistan, southern Kazakhstan, Afghanistan, and Pakistan." Nader & Kock (1983c) and Harrison & Bates (1991) delineated the western margin of the distribution range of *R. f. irani* by Iraqi records of the species, Dohuk and 130 km west of Ramadi (cf. Harrison 1964a, Niazi 1976). Nader & Kock (1983c) also reported Turkish specimens from Sultanhani (Niğde Prov., central Anatolia) to be dimensionally intermediate between *irani* and *ferrumequinum* (LCc 20.2–21.3 mm, mean 20.9 mm, n=10). According to the above results (Felten et al. 1977, DeBlase 1980, Nader & Kock 1983c), the nominotypical subspecies or the intermediate form *ferrumequinum/irani* should presumably occur in Syria.

The comparison of skull dimensions showed three clusters within the material of Syrian bats, grouped according to size and geographic origin (Fig. 31). Bats with the largest skull (LCc 20.0–21.4 mm; CM^3 8.6–9.1 mm) come from the Mediterranean part of Syria, while those with the smallest skull (LCc 19.1–19.8 mm; CM^3 8.1–8.4 mm) from an arid region close to Iraqi border, on the lower Euphrates (As Salihiyyah) (Figs. 31, 32). Ranges of dimensions in these clusters do not overlap in the skull lengths (with the exception of CM_3) and only slightly overlap in the skull widths (Table 5). The third cluster is composed of bats from the upper part of the Syrian Euphrates (Qala'at Najm) – a transition area between the Mediterranean and the most arid parts of Syria. These bats are in an intermediate position in their size between the above two groups (LCc 19.8–20.5 mm; CM^3 8.1–8.7 mm), their dimension ranges mostly overlap with those of the two former clusters (Table 5). Similar intergradations as in the size can be observed also in pelage tinge in the three samples. The Mediterranean bats have brownish-grey dorsal fur, while

Table 5. Basic biometric data on examined Syrian and comparative samples of *Rhinolophus ferrumequinum* (Schreber, 1774). For abbreviations see pp. 10, 11

	Syrian Mediterranean					Syrian Upper Euphrates					Syrian Lower Euphrates				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	20	**58.77**	55.7	61.2	1.421	6	**58.25**	57.4	59.1	0.638	7	**54.24**	52.8	56.5	1.198
LCr	22	**23.95**	23.10	24.89	0.423	6	**23.10**	22.64	23.62	0.360	7	**22.53**	22.18	22.87	0.274
LCc	22	**20.76**	19.98	21.39	0.323	6	**20.10**	19.82	20.54	0.249	7	**19.35**	19.09	19.75	0.237
LaZ	21	**12.26**	11.47	12.62	0.308	6	**11.73**	11.41	11.92	0.207	7	**11.25**	11.01	11.62	0.205
LaI	22	**2.45**	2.20	2.88	0.159	6	**2.52**	2.30	2.64	0.134	7	**2.49**	2.27	2.79	0.191
LaN	21	**9.35**	9.02	9.78	0.199	6	**9.22**	9.03	9.47	0.178	7	**8.99**	8.85	9.18	0.139
ANc	21	**7.08**	6.62	7.57	0.248	5	**6.71**	6.44	7.07	0.240	7	**6.51**	6.36	6.86	0.177
CC	22	**6.64**	6.28	7.02	0.166	6	**6.25**	6.03	6.42	0.157	7	**6.10**	5.95	6.34	0.138
M^{3}M^3	22	**8.70**	8.42	9.08	0.179	6	**8.42**	8.18	8.58	0.159	7	**8.21**	8.00	8.42	0.138
CM^3	22	**8.80**	8.58	9.13	0.159	6	**8.38**	8.08	8.67	0.192	7	**8.23**	8.08	8.36	0.111
LMd	22	**15.97**	15.28	16.53	0.280	6	**15.33**	15.08	15.66	0.249	7	**14.73**	14.57	14.90	0.130
ACo	22	**4.09**	3.73	4.33	0.150	6	**3.91**	3.67	4.22	0.235	7	**3.59**	3.51	3.72	0.074
CM$_3$	22	**9.42**	8.75	9.84	0.219	6	**8.95**	8.57	9.22	0.232	7	**8.81**	8.61	8.98	0.155

	Syria (all samples)					S Turkey & Cyprus					Iran				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	33	**57.72**	52.8	61.2	2.218	29	**56.75**	54.5	59.4	1.352	3	**57.47**	55.0	59.3	2.219
LCr	35	**23.52**	22.18	24.89	0.703	26	**23.74**	23.13	24.65	0.386	3	**22.96**	22.58	23.43	0.431
LCc	35	**20.36**	19.09	21.39	0.637	26	**20.54**	19.83	21.12	0.368	3	**19.73**	19.08	20.40	0.660
LaZ	34	**11.96**	11.01	12.62	0.494	27	**12.22**	11.67	12.71	0.256	3	**11.89**	11.59	12.39	0.438
LaI	35	**2.47**	2.20	2.88	0.160	27	**2.46**	2.08	2.93	0.164	3	**2.32**	2.09	2.48	0.204
LaN	34	**9.25**	8.85	9.78	0.228	27	**9.42**	9.10	9.82	0.177	3	**9.07**	8.90	9.20	0.154
ANc	33	**6.90**	6.36	7.57	0.334	26	**7.02**	6.53	7.53	0.263	3	**6.66**	6.61	6.75	0.078
CC	35	**6.47**	5.95	7.02	0.283	27	**6.62**	6.26	7.08	0.234	3	**6.22**	6.11	6.42	0.176
M^{3}M^3	35	**8.56**	8.00	9.08	0.262	27	**8.67**	8.29	9.02	0.177	3	**8.51**	8.38	8.63	0.125
CM^3	35	**8.61**	8.08	9.13	0.291	27	**8.67**	8.29	9.09	0.199	3	**8.31**	8.08	8.52	0.221
LMd	35	**15.61**	14.57	16.53	0.563	27	**15.72**	14.98	16.48	0.362	3	**15.09**	14.58	15.70	0.566
ACo	35	**3.96**	3.51	4.33	0.252	27	**3.99**	3.71	4.32	0.170	3	**3.81**	3.57	4.07	0.251
CM$_3$	35	**9.22**	8.57	9.84	0.340	27	**9.35**	8.92	9.78	0.240	3	**8.92**	8.63	9.24	0.306

	Balkans					Central Europe					Maghreb				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	99	**57.69**	54.8	62.0	1.435	0	–	–	–	–	9	**55.46**	54.5	57.5	0.847
LCr	74	**23.79**	22.70	24.82	0.406	12	**23.57**	23.02	23.93	0.274	21	**22.63**	22.17	22.96	0.213
LCc	104	**20.69**	19.88	21.76	0.340	29	**20.41**	20.18	20.79	0.164	21	**19.59**	19.23	20.02	0.216
LaZ	105	**12.11**	11.27	12.86	0.299	30	**11.97**	11.54	12.43	0.207	21	**11.73**	11.33	12.11	0.208
LaI	109	**2.52**	2.09	3.04	0.185	30	**2.67**	2.31	2.94	0.169	21	**2.67**	2.47	2.81	0.092
LaN	106	**9.42**	8.05	10.18	0.248	29	**9.51**	9.22	9.76	0.138	21	**9.25**	9.07	9.41	0.124
ANc	104	**6.90**	6.19	7.43	0.258	29	**6.95**	6.45	7.44	0.220	21	**6.68**	6.29	7.12	0.226
CC	107	**6.58**	5.89	7.22	0.208	29	**6.47**	6.21	6.86	0.151	21	**6.34**	6.09	6.67	0.132
M^{3}M^3	108	**8.64**	7.95	9.07	0.209	27	**8.57**	8.27	8.91	0.187	21	**8.38**	8.11	8.66	0.146
CM^3	109	**8.63**	6.63	9.08	0.251	29	**8.48**	8.33	8.65	0.102	21	**8.23**	7.97	8.47	0.132
LMd	109	**15.72**	14.94	16.48	0.301	30	**15.43**	15.07	16.05	0.217	21	**14.99**	14.63	15.41	0.228
ACo	109	**3.98**	3.43	4.40	0.169	30	**3.94**	3.64	4.24	0.154	21	**3.81**	3.44	4.19	0.172
CM$_3$	109	**9.28**	8.72	9.73	0.193	30	**9.12**	8.92	9.32	0.116	21	**8.84**	8.62	9.09	0.133

Table 5. (continued)

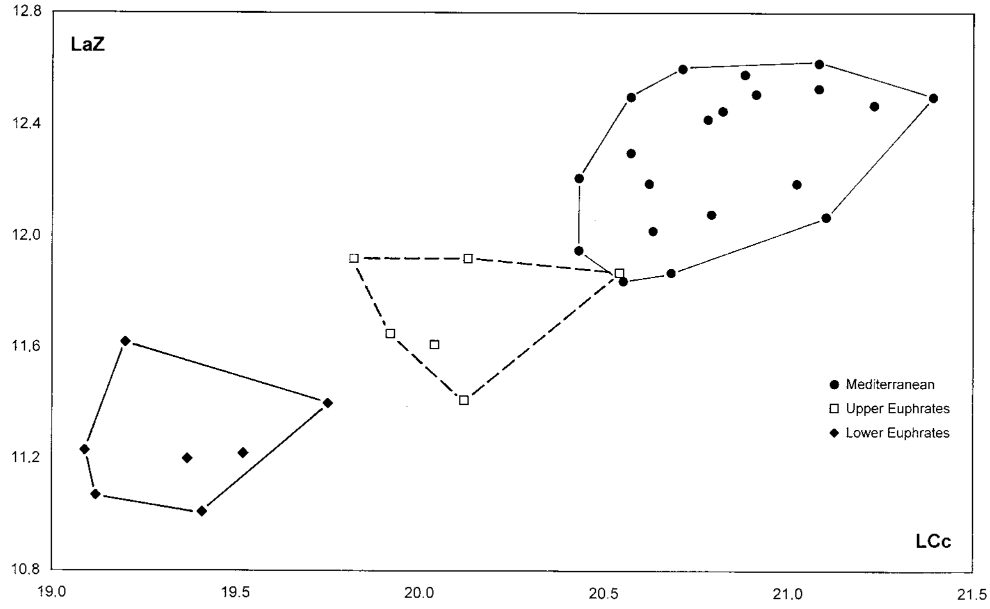
	W Transcaucasia					E Transcaucasia					Central Asia				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	14	**56.69**	55.4	60.5	1.241	7	**55.11**	54.4	56.0	0.579	5	**57.46**	53.7	62.0	3.086
LCr	14	**23.26**	22.22	23.81	0.444	11	**22.54**	21.79	23.12	0.378	5	**22.66**	21.72	23.17	0.561
LCc	18	**20.17**	19.44	20.67	0.323	14	**19.51**	18.98	19.82	0.227	5	**20.07**	19.11	20.43	0.549
LaZ	18	**11.84**	11.22	12.32	0.266	14	**11.46**	11.02	11.88	0.209	5	**11.29**	11.09	11.40	0.120
LaI	18	**2.49**	2.22	2.73	0.142	14	**2.54**	2.30	2.92	0.155	5	**2.70**	2.43	2.88	0.212
LaN	18	**9.29**	9.02	9.61	0.176	14	**9.22**	8.92	9.58	0.183	5	**9.46**	9.04	9.82	0.298
ANc	18	**6.72**	6.12	7.01	0.204	14	**6.68**	6.48	7.03	0.170	5	**6.37**	6.21	6.56	0.169
CC	18	**6.30**	6.08	6.54	0.131	14	**6.03**	5.66	6.42	0.206	5	**5.83**	5.59	6.08	0.193
M^3M^3	18	**8.44**	8.12	8.74	0.166	14	**8.19**	7.96	8.57	0.190	5	**8.24**	8.07	8.43	0.173
CM^3	18	**8.39**	8.02	8.74	0.169	14	**8.04**	7.76	8.30	0.174	5	**8.32**	8.14	8.52	0.172
LMd	18	**15.39**	14.82	15.83	0.269	13	**14.67**	14.33	15.08	0.202	5	**15.10**	14.27	15.48	0.483
ACo	18	**3.79**	3.34	4.08	0.178	13	**3.56**	3.37	3.81	0.135	5	**3.51**	3.17	3.79	0.240
CM_3	18	**9.02**	8.67	9.31	0.157	13	**8.62**	8.23	8.97	0.188	5	**8.84**	8.63	9.02	0.163

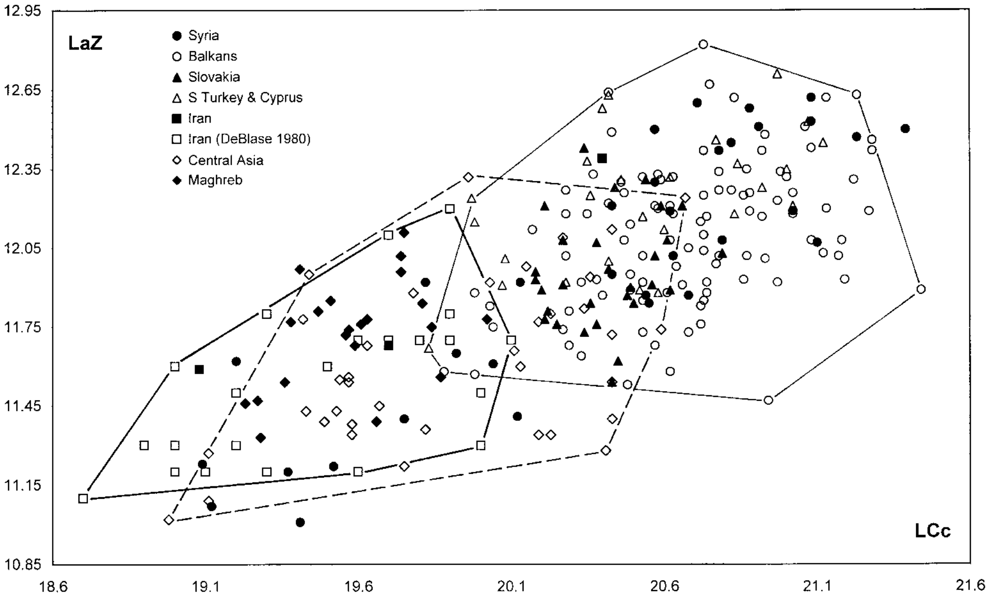
individuals from the lower Euphrates are rather pale brown to beige (Fig. 33). There is a clear cline decrease in size and ‘paling’ in the pelage tinge among the three clusters, depending on relative humidity of habitat; largest and darkest bats come from relatively humid Mediterranean region, smallest and palest ones from the relatively dry semi-desert region of Mesopotamia, and intermediate bats from the transition area.

The size differences between the western and eastern Syrian samples of *R. ferrumequinum* correspond with the distinctions between two subspecies in the Near East (see Table 5, Figs. 28, 32), according to the traditional taxonomy (see above). The larger bats of western Syria are similar in size to the Balkan, Central European, Turkish and Cypriot samples of *R. f. ferrumequinum*, while those from eastern Syria fall in the size range of *R. f. irani* from Iran (most of the data are taken from DeBlase 1980) and Central Asia. As the samples from the upper Euphrates show, there is a transition in skull size between the two above populations, however, bats from Qala’at Najm rather conform to the size range of *R. f. ferrumequinum* than of *R. f. irani*.

However, a question arises whether the humidity/climate-dependent size and colour relations in relatively close areas (distances of about 150–300 km between samples) are a good foundation for any taxonomic conclusion. Similar size differences among *R. ferrumequinum* populations from different habitats within short distances in Central Asia were reported also by Strelkov (1971b), Strelkov et al. (1978) and Habilov (1992). Strelkov found larger and darker bats (LCc 18.0–19.3, n=29) in the relatively more humid mountains of southern Turkmenistan and Uzbekistan, while smaller and paler individuals (LCc 17.3–18.9, n=55) in the Karakum Desert, some 200–300 km from the former areas.

These size and colour differences in bats from Central Asia are similar to those observed in Syrian populations, however, Strelkov et al. (1978) did not separate their small Karakum bats into a different subspecies (the larger bats rather conform to the size of *R. f. irani* by DeBlase 1980). Whether the humidity-dependent size variation found in Syria is a good reason for taxonomic division or whether there are relatively recent changes in morphology, could be probably solved only by a genetic analysis. According to the traditional taxonomy, followed also by the most recent authors (Csorba et al. 2003, Simmons 2005), two subspecies of *R. ferrumequinum* occur in Syria, the nominotypical one in the western, Mediterranean part of the country and *R. f. irani* in the semi-desert east where it is in contact with populations in Iraq (Harrison & Bates 1991).





Figs. 31, 32. Bivariate plots of examined Syrian and comparative samples of *Rhinolophus ferrumequinum*. 31 (above) – condylocanine length of skull (LCc) against the zygomatic width (LaZ) in Syrian samples. 32 (below) – condylocanine length of skull (LCc) against the zygomatic width (LaZ) in the West Palaearctic samples. Explanation: thin-lined polygon = samples of Eurasian Mediterranean (n=159), i.e. *R. f. ferrumequinum* (Schreber, 1774); bold-lined polygon = Persian samples (both those examined by us [n=3] and published by DeBlase 1980 [n=26]), i.e. *R. f. irani* Cheesman, 1921; dashed polygon = samples of Central Asia (incl. Transcaucasia; n=39).

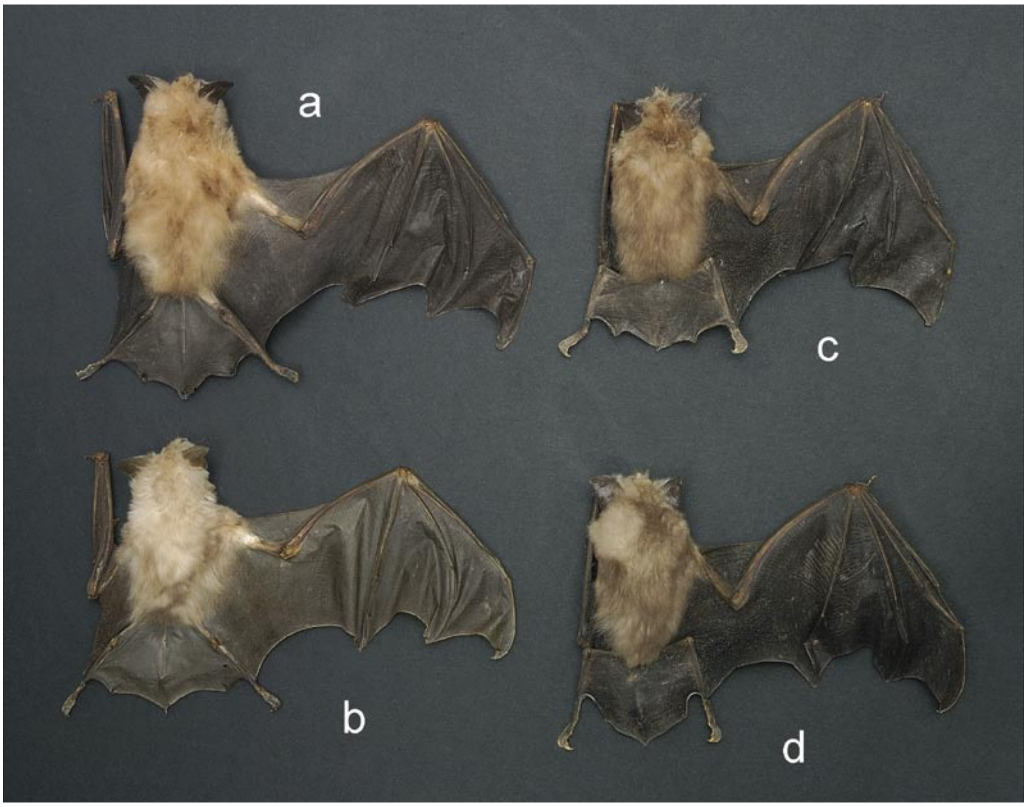


Fig. 33. Pelage coloration in *Rhinolophus ferrumequinum*: a – *R. f. ferrumequinum* (Schreber, 1774) (female, NMP 48937, Syria, Qala'at Samaan), b – *R. f. irani* Cheesman, 1921 (male, NMP 48974, Syria, As Salihiyyah), c – *R. f. ferrumequinum* (Schreber, 1774) (female, NMP 48709, Greece, Despotiko Cave), d – *R. f. ferrumequinum* (Schreber, 1774) (male, NMP 48638, Greece, Maronia).

Two more details concerning intraspecific variation of *R. ferrumequinum* have been found by the simple comparison of skull dimensions of the Mediterranean populations (Table 5, Fig. 32). The samples of horseshoe bats from central Anatolia, which were identified as intermediate individuals (see above) by Nader & Kock (1983c), fell by their measurements well into variation range of *R. f. ferrumequinum* from Europe. These samples therefore seem to represent rather the nominotypical form as the other ones of the Mediterranean origin.

Bats from the Maghreb are close in size to the samples from eastern Syria, Iran, and Central Asia, i.e. to the subspecies *R. f. irani*. Therefore, a similar separate status should be expressed for the Maghrebian populations of *R. ferrumequinum*. The name *R. f. obscurus* Cabrera, 1904 (t.t.: Sr. Crú, Valencia [Spain]) was proposed for the Maghrebian populations e.g. by Andersen (1905a, b), Allen (1939), Ryberg (1947), Panouse (1951), Hayman & Hill (1971), Felten et al. (1977), etc. Since this name was described from Iberia, where *R. f. ferrumequinum* was suggested to occur (Miller 1912, Ellerman & Morrison-Scott 1951, Bauer 1956a, Dulic & Felten 1964, Caubère et al. 1968, Corbet 1978, Horáček et al. 2000, Gaisler 2001a, de Paz 2002, Csorba et al. 2003, etc.), it seems to be unavailable for designation of distinct African populations. However, the taxonomic findings from Iberia were applied to populations of North Africa, probably due to the lack of comparative material (Aellen & Strinati 1970, Gaisler 1983, Kowalski & Rzebik-Kowalska 1991). Palmeirim (1990) found very small individuals of *R. ferrumequinum* in the southern Portugal, which markedly differed from the larger bats inhabiting northern Iberia. Therefore, it is possible that the small Maghrebian form occurs also in southern Iberia (comp. Andersen 1905a, Felten et al. 1977), but is absent from continental Europe, incl. northern Spain (see the comparison by Palmeirim 1990). However, no name in the synonymy of *R. ferrumequinum* is available for such form.

FEEDING ECOLOGY. *Rhinolophus ferrumequinum* is a large bat seeking prey close to foliage, believed to take prey from the ground, hawking in open air and also hunting from perches (Norberg & Rayner 1987, Jones & Rayner 1989, Gaisler 2001a). Lepidoptera, Coleoptera, Diptera and Hymenoptera are the most important food items (Jones 1990, Beck 1995, Rahmatulina 2005).

We analysed five samples of faeces (see Fig. 34) and 20 digestive tracts of *R. ferrumequinum* from Syria. Lepidoptera, Coleoptera (mostly Scarabaeidae) and Nematocera were recorded to be the most abundant prey categories. The representatives of both Lepidoptera and Scarabaeidae found in the diet of *R. ferrumequinum* were rather the larger ones. Data obtained by the analysis of digestive tract contents are in most cases similar to the results of faeces analysis. Results worth mentioning were revealed in one digestive tract collected at the Qala'at Sheisar Castle – Lepidoptera (50% of volume), Orthoptera (20%), Odonata (10%), Diptera (10%), and Solpugida (10%).

Our analysis of the *R. ferrumequinum* diet corresponds well with the results of the previous studies and confirms the representatives of Lepidoptera and Coleoptera to be the most important prey categories. Frequent presence of solely larger individuals of only one prey category in one sample (three of the five faeces samples contained only one prey category) conforms well with the statement by Jones (1990) about selective hunting of this bat species. Presence of Solpugida proved gleaning to be used as one of the hunting strategies by *R. ferrumequinum*.

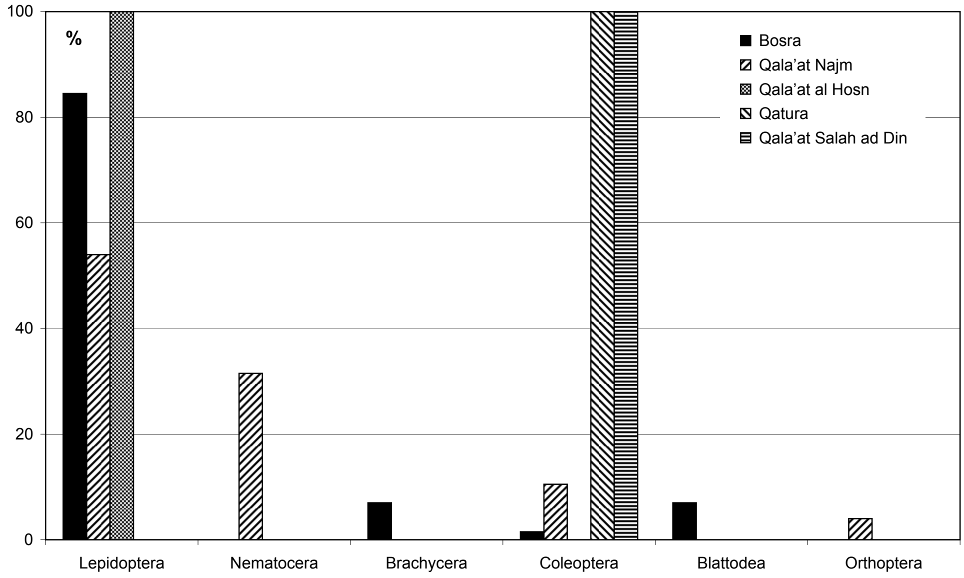


Fig. 34. Volume of particular food items in the diet of *Rhinolophus ferrumequinum* (Schreber, 1774) from Syria. Only three pellets were analysed from the Qala'at Salah ad Din sample.

Rhinolophus hipposideros (Bechstein, 1800)

RECORDS. **Original data**: Al Lathiqiyeh: Qala'at Salah ad Din [1], castle ruins, 30 June 1998: obs. nurs. colony of ca. 10 ad. and several juv. inds.; 13 October 2004: obs. 2 inds. – Dimashq: Barqash [2], ruins of Byzantine church, 27 May 2001: obs. 2 inds.; – Yabroud [3], small cave in an escarpment above the town, 5 October 2004: obs. 1 fs. – Homs: Qala'at al Hosn [4], ruins of Krak des Chevaliers, castle cellar, 15 July 1997: obs. nurs. colony (min. 7 ad., 4 juv. inds.), 28 June 1998: obs. nurs. colony (min. 2 ad., 2 juv. inds., coll. 1 fa, 2 fj); 29 May 2001: obs. 3 inds.; 18 October 2004: obs. 2 inds. – Suweida: Qanawat [5], abandoned garden house, 27 April 2001: coll. 1 faG. – Tartus: 5 km W Qala'at al Hosn [6], 13 May 2001: net. 1 faG. – **Published data**: Quneitra / Golan Heights: Golan Heights and Mount Hermon, four unidentified records mapped in central and northern parts of this region [roughly the areas of Mount Hermon, Ortal, Katsrin and Gamla] (Mendelssohn & Yom-Tov 1999).

POSSIBLE RECORDS (Syria *sensu lato*). **Published data**: Levante (Fitzinger 1870a). – Syrie, 1878, 1 ind. ad. (Jentink 1888).

DISTRIBUTION. **General**. *Rhinolophus hipposideros* is a species with mostly a Mediterranean type of distribution (Corbet 1978, Koopman 1994, Horáček et al. 2000, Roer & Schober 2001, Csorba et al. 2003). It occurs from the Maghreb, British Islands, and western Europe, over central and southeastern Europe, the European Mediterranean (incl. most of its islands), the Caucasus Region and the Near East to Central Asia and Kashmir. However, it reaches also the Afro-tropical region and is found along the Rift Valley from the Levant, over Sinai and western Saudi Arabia to Eritrea, Djibouti, Ethiopia and Sudan (Morisson-Scott 1939, Qumsiyeh 1985, Kock 1969, Largen et al. 1974, Pearch et al. 2001).

Near East. *R. hipposideros* occurs mainly in the Mediterranean parts of the Near East, including Turkey, Cyprus, Syria, Lebanon, however, it is rare or absent in the more arid regions (Harrison & Bates 1991, Benda & Horáček 1998). Only one old record is available from Mesopotamia (Cheesman 1920).

Records of *R. hipposideros* cover almost the whole territory of Turkey, except for central Anatolian and Mesopotamian steppes (Doria 1887, Andersen 1905a, Strinati 1959, Çağlar 1965, von Lehmann 1966, Felten et al. 1977, Spitzenberger 1979, von Helversen 1989, Albayrak 1990a, 1993a, 2003, Steiner & Gaisler 1994, Benda & Horáček 1998, Özgül et al. 2000, Furman & Özgül 2002, Karataş et al. 2006, Yiğit et al. 2006, our unpubl. data). However, in southeastern Turkey some records come from the margin of Mesopotamian steppe region (Albayrak 1990a, Karataş & Sachanowicz in press).

In Lebanon, there are at least six records of *R. hipposideros* coming from the southern part of the country (Lewis & Harrison 1962, Harrison 1964a, 1972, Atallah 1977, Tohmé & Tohmé 1985). This bat species is distributed throughout Palestine; the majority of its records was made in the Mediterranean region but some also in desert regions of the Arava Valley and Negev (Bodenheimer 1958, Harrison 1964a, Felten et al. 1977, Makin 1977, 1987, Yom-Tov et al. 1992a, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Korine & Pinshow 2004). Several records come also from the Hula Valley and surroundings of Lake Tiberias (Harrison 1964a, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999). In Jordan, two records were reported from the Ajloun Hills in the northwestern corner of the country (Qumsiyeh 1980, Qumsiyeh et al. 1992).

Two records of *R. hipposideros* come from mountainous part of the southern Sinai, Egypt (Wassif & Hoogstraal 1954, Wassif et al. 1984). In Iraq, the only record of this bat has been reported by Cheesman (1920) from Baghdad. Published data (Etemad 1967, Lay 1967, DeBlase 1980) and our unpublished records of this bat in western Iran, however, come only from the mountainous regions of the Zagros Range and the Armenian Highlands.

A common occurrence of *R. hipposideros* has been documented in Cyprus (Doria 1887, Bate 1903, Andersen 1905a, 1907b, Spitzenberger 1979, Boye et al. 1990, Heller et al. 2001, our unpubl. data).

Syria (Fig. 35). *R. hipposideros* is a medium-frequent bat in Syria, 10 records are known (Table 1). In Syria, it was previously known only from the Golan Heights (Mendelssohn & Yom-Tov 1999). From Syria *proper*, accurate localities of this species are given here for the first time. The reports by Fitzinger (1870a) and Jentink (1888) more probably represent records from present--day Lebanon, as a rule (see above). The mention of 'Syria' by Horáček et al. (2000) refers to two records from the Jebel An Nusariyah Mts [1, 4] preliminary reported by Benda et al. (1999a).

Our records from the Jebel An Nusariyah and Anti-Lebanon Mts well fill gap of almost 300 km in the formerly interrupted range of the species distribution in the Levant (see e.g. Harrison & Bates 1991) between southern Lebanon and the Golan Heights in the south and Hatay in the north [1–4, 6] (Fig. 35).

An unexpected record from the Jebel Al Arab [5] support the view that this mountain acts as a relic island of the Mediterranean woodlands within Mesopotamian steppes and semi-deserts (cf. Zohary 1973; see Fig. 1), which is inhabited by several other Mediterranean mammalian species, besides *Rhinolophus ferrumequinum* among bats (see above) also by *Crocidura suaveolens* (Pallas, 1811), *Spalax ehrenbergi* Nehring, 1898, *Apodemus mystacinus* (Danford et Alston, 1877), or *Cricetulus migratorius* (Palas, 1773) among insectivores and rodents (our unpubl. data).

Field notes. In Syria, *Rhinolophus hipposideros* was most often found in its roosts. Small groups (colonies) were observed four times in the majestic castle of Krak des Chevaliers (Fig. 8); in its southeastern part with thickest walls (and presumably with most constant temperature and humidity – in stables and the eastern 'first' tower), a colony of seven adults with four juveniles

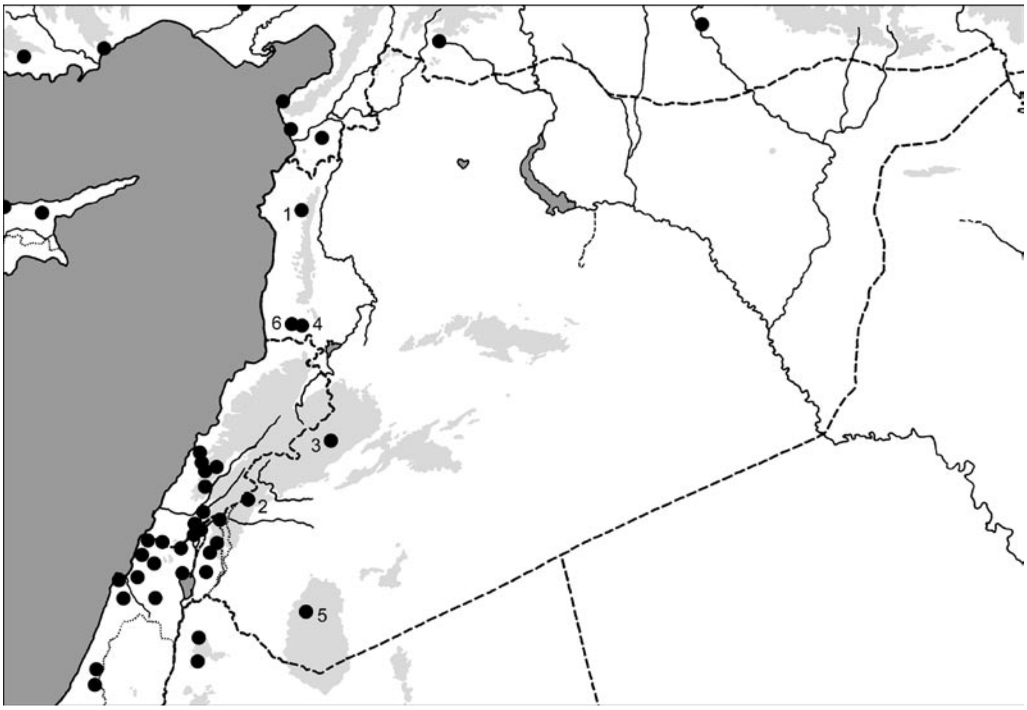


Fig. 35. Records of *Rhinolophus hipposideros* (Bechstein, 1800) in Syria and surrounding areas.

of different growth stages was observed on 15 July 1997. A year later, on 28 June 1998, a small group of two adults and two juveniles was found in the same room. During visits on 29 May 2001 and on 18 October 2004, three and two roosting individuals were found there, respectively. Two observations of *R. hipposideros* come from the castle ruins of Qala'at Salah ad Din (Fig. 40); a colony of 10 adults with several juveniles on 30 June 1998, and only two individuals on 13 October 2004. In uneasily accessible caverns in the ruined Byzantine church of Barqash, two individuals were found (Fig. 36). One pregnant female was found in an abandoned garden house at Qanawat, where no traces of a colony were observed. The only inartificial site of *R. hipposideros* in Syria is represented by a small cave in an escarpment above Yabroud, where an individual was observed to roost (Fig. 37). The species was netted only at one site in Syria, in an orchard ca. 5 km west of Qala'at al Hosn.

Bat species associated with *R. hipposideros* in Syria in roosts were *R. ferrumequinum*, *M. myotis*, *M. blythii* and *M. schreibersii* (Krak des Chevaliers), and *R. ferrumequinum*, *R. euryale*, *M. nattereri*, and *M. emarginatus* (Qala'at Salah ad Din), respectively. However, only *R. ferrumequinum* was found occupying the same room (Krak des Chevaliers). During a netting session at Qala'at al Hosn, one individual of *R. euryale* was caught together with *R. hipposideros*.

A pregnant female was recorded at Qanawat on 27 April 2001, it contained one foetus 9.4 mm long. Juveniles of *R. hipposideros* were found in colonies in June and July. Two juveniles were collected in Qala'at Salah ad Din on 30 June 1998, a volant one with LAt of 35.5 mm (93.4% of the mean from adults) and a small and non-volant one with LAt of 15.3 mm (40.3%) snuggled to its lactating mother. Juveniles were also observed on 15 July 1997 in Krak des Chevaliers. In all observations, the juveniles were found in different growth stages. The births seem to occur in Syria from the end of May to the first half of July, perhaps on average a month earlier than in northern Turkey (Aşan Baydemir & Albayrak 2006) or in Europe (Roer & Schober 2001).

Similarly as in other parts of the Middle East, no rests of *R. hipposideros* were found in the diet of owls in Syria (Table 35; unlike the situation known in Europe, see e.g. Obuch 1998, Roer & Schober 2001).

MATERIAL EXAMINED. 1 fa, 2 fj (NMP 48054 [S+A], 48055, 48056 [A]), Qala'at Salah ad Din, 30 June 1998, leg. M. Andreas & M. Uhrin; – 1 fa (NMP 48979 [S+A]), Qanawat, 27 April 2001, leg. P. Munclinger & P. Nová.

MORPHOLOGY. See Table 6 and Appendix III for biometric data on the Syrian specimens of *Rhinolophus hipposideros*. Dental and cranial characters of Syrian specimens of *R. hipposideros* are shown in Fig. 38.

TAXONOMY. *Rhinolophus hipposideros* is mostly considered a polytypic species, including a number of subspecies (Peters 1871, Andersen 1904, 1905a, b, 1907b, 1918, Allen 1939, Ellerman & Morrison-Scott 1951, Strelkov 1963, 1981, Saint-Girons & Caubère 1966, Etemad 1967, Hayman & Hill 1971, Felten et al. 1977, Corbet 1978, 1984, Koopman 1994, Horáček et al. 2000, Roer & Schober 2001). The most recent authors (Csorba et al. 2003, Simmons 2005) have recognised six subspecies within the species rank, viz. *R. h. hipposideros* (Bechstein, 1800) (terra typica: France), *R. h. minutus* (Montagu, 1808) (t.t.: Wiltshire, England), *R. h. minimus* Heuglin, 1861 (t.t.: Keren [Eritrea]), *R. h. midas* Andersen, 1905 (t.t.: Jask, Persian Gulf [SE Iran]), *R. h. majori* Andersen, 1918 (t.t.: Patrimonio, N. Corsica), and *R. h. escalerae* Andersen, 1918 (t.t.: Ha-ha, Mogador, Morocco). However, some of these taxa need a profound revision (Csorba et al. 2003).

Occurrence of three subspecies* has been reported from the Near East and the eastern part of the Mediterranean, for a review see Table 7 and/or Felten et al. (1977), DeBlase (1980), and Benda & Horáček (1998). Generally, there are two basic concepts of the taxonomy of *R. hipposideros*. The rather conservative view was introduced by Andersen (1905a) and was based mainly on the

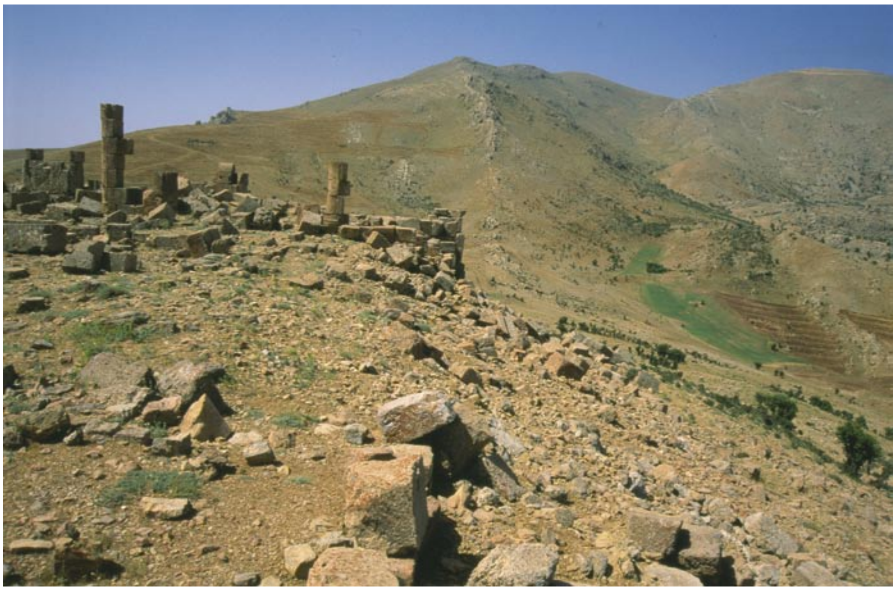


Fig. 36. Ruins of Byzantine church at Barqash (1440 m a. s. l.) in a semi-arid mountainous lansdcape near to the northern tip of the Mount Hermon range. Two individuals of *Rhinolophus hipposideros* were observed in the church ruins, while in a valley below the ruins, two females of *Hypsugo savii* were netted (photo by A. Reiter).

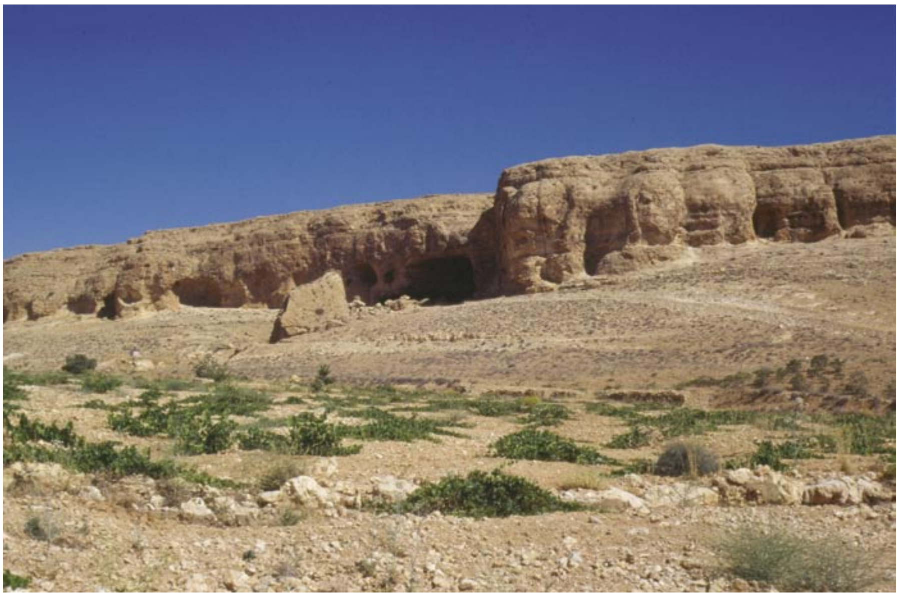


Fig. 37. Series of caves and rocky fissures in the escarpment above the oasis of Yabroud (Anti-Lebanon Mts), the finding site of *Rhinolophus hipposideros* and *Tadarida teniotis*, and netting place of *Myotis nattereri*, *Hypsugo savii* and *Plecotus macrobullaris*. There were detected also echolocation calls of *Pipistrellus pipistrellus* and *P. kuhlii* (photo by P. Benda).

differences in forearm length of the compared samples. This was, however, followed by most of the above authors (principally by Saint-Girons & Caubère 1966), recognising several forms among populations of the Mediterranean and adjacent regions (Table 7). A different opinion was published by Felten et al. (1977) who used skull morphology and dimensions. This view was presented also by Corbet (1978) who mentioned only two subspecies within the whole species range, *R. h. hipossideros* in Europe, the Maghreb, and the western portion of the Near East, and *R. h. midas* in the eastern part of the range from Iraq to Kashmir. In addition, Felten et al. (1977) separated bats from Crete and Eritrea to *R. h. minimus* described from East Africa. This separation was followed by Nader (1982), assigning South Arabian populations to the latter form. Later on, the concept by Felten et al. (1977) was supported by the results by Palmeirim (1990). According to the opinions being, all three forms of *R. hipposideros* recognised in the Near East could meet in Syria (sensu Andersen's views, see Table 7), or alternatively, Syrian populations could belong to the nominotypical subspecies, provided that the opinion by Felten et al. (1977) is accepted.

However, karyological results, quite a different type of evidence, suggest a possible third type of geographic division of *R. hipposideros* (Zima et al. 1992, Zima 2004). While the examined specimens from Central Europe (Czech Republic, Slovakia), the Balkans (Bulgaria, Greece), and Transcaucasia (Azerbaijan) show the diploid number of 56 chromosomes, those from the Near East (Anatolia, Syria, Jordan) possess 58 chromosomes (for a review see Zima et al. 1992, Zima 2004,

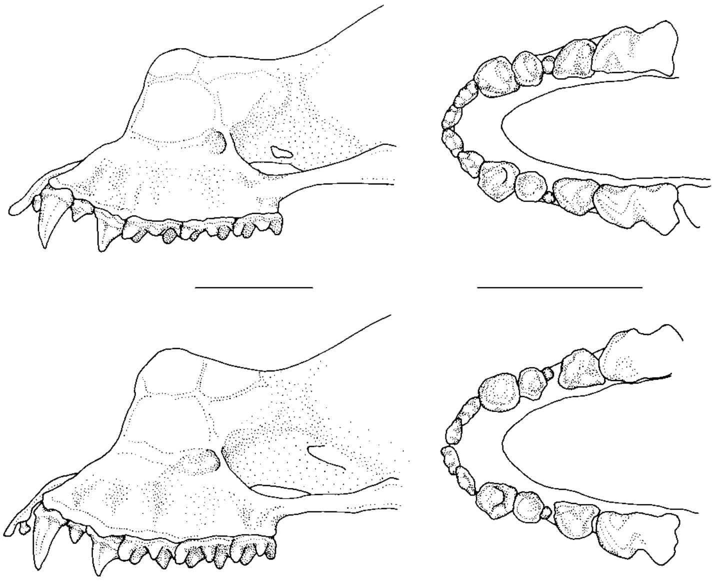


Fig. 38. Rostral parts of skulls and of mandibular dentitions of *Rhinolophus hipposideros* (Bechstein, 1800) from Syria (above: female, NMP 48979, Qanawat; below: female, NMP 48054, Qala'at Salah ad Din). Scale bars = 2.5 mm.

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* Note. Felten et al. (1977) mentioned an additional subspecies described from the Middle East, *R. h. billanjani* DeBlase, 1971. Corbet (1984) quoted this name differently: "*Rinolophus hipposideros billanyani* DeBlase, 1972. Shahpur Cave (29°48'N, 51°37'E), Fars Prov., Iran. Subsequently considered 'invalid' (presumably a synonym of *R. h. midas*) by the same author (DeBlase 1980)." Although the name *billanjani* or *billanyani* was accepted into the synonymy of *R. hipposideros* also by some other authors (Strelkov 1981, Borisenko & Pavlinov 1995, Benda & Horáček 1998), this name represents a nomen nudum since its description has not been formally published (see DeBlase 1980).

Table 6. Basic biometric data on examined Syrian and comparative samples of *Rhinolophus hipposideros* (Bechstein, 1800). For abbreviations see pp. 10, 11

	Syria					S Turkey & Cyprus					Balkans				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	2	**38.00**	37.4	38.6	0.849	12	**36.82**	35.2	39.0	0.982	59	**38.13**	34.9	40.3	1.120
LCr	2	**15.74**	15.54	15.93	0.276	11	**15.79**	15.12	16.10	0.293	52	**16.10**	15.03	16.76	0.329
LCc	2	**13.43**	13.38	13.48	0.071	13	**13.30**	12.82	13.64	0.240	65	**13.68**	13.02	14.14	0.215
LaZ	2	**7.40**	7.32	7.48	0.113	13	**7.35**	7.08	7.61	0.159	61	**7.53**	7.23	8.10	0.164
LaI	2	**1.60**	1.58	1.62	0.028	13	**1.61**	1.38	1.91	0.161	70	**1.60**	1.38	2.00	0.112
LaN	2	**6.41**	6.37	6.45	0.057	13	**6.42**	6.15	6.67	0.148	70	**6.57**	6.21	6.89	0.148
ANc	2	**4.61**	4.48	4.73	0.177	13	**4.51**	4.31	4.72	0.124	66	**4.65**	4.33	4.93	0.112
CC	2	**3.39**	3.30	3.47	0.120	12	**3.34**	3.18	3.54	0.121	66	**3.42**	2.98	3.88	0.124
M^3M^3	2	**5.26**	5.17	5.35	0.127	13	**5.21**	5.02	5.42	0.120	70	**5.36**	4.93	5.64	0.122
CM^3	2	**5.26**	5.25	5.27	0.014	13	**5.29**	5.14	5.49	0.115	69	**5.32**	5.08	5.53	0.111
LMd	2	**9.61**	9.55	9.67	0.085	13	**9.47**	9.13	9.87	0.184	70	**9.73**	9.25	10.10	0.187
ACo	2	**1.89**	1.75	2.02	0.191	13	**1.97**	1.80	2.16	0.123	71	**1.98**	1.67	2.24	0.115
CM_3	2	**5.42**	5.36	5.47	0.078	13	**5.44**	5.22	5.61	0.126	70	**5.46**	5.17	5.72	0.123

	Central Europe					Maghreb				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	0	–	–	–	–	6	**34.98**	33.9	36.5	0.898
LCr	7	**16.43**	16.17	16.56	0.127	6	**15.50**	15.32	15.84	0.184
LCc	31	**14.13**	13.75	14.58	0.216	7	**13.27**	13.13	13.67	0.207
LaZ	31	**7.74**	7.44	8.09	0.149	8	**7.14**	6.65	7.39	0.245
LaI	31	**1.72**	1.49	1.97	0.105	8	**1.55**	1.26	1.72	0.151
LaN	32	**6.70**	6.42	6.93	0.144	8	**6.56**	6.42	6.82	0.124
ANc	29	**4.78**	4.55	5.10	0.113	7	**4.56**	4.27	4.76	0.180
CC	29	**3.60**	3.42	3.81	0.092	8	**3.30**	3.19	3.42	0.093
M^3M^3	32	**5.47**	5.29	5.69	0.101	8	**5.23**	5.01	5.45	0.151
CM^3	32	**5.46**	5.26	5.63	0.106	8	**5.20**	4.94	5.41	0.171
LMd	31	**10.04**	9.72	10.34	0.183	8	**9.36**	9.05	9.77	0.216
ACo	29	**2.03**	1.87	2.16	0.079	8	**1.83**	1.71	1.93	0.077
CM_3	32	**5.64**	5.46	5.87	0.105	8	**5.29**	5.11	5.44	0.134

and for additional data Benda & Horáček 1998, Hanák et al. 2001). A third form from Kirghizstan with 2n=62 could represent a separate species (Horáček & Zima 1996, Zima 2004). Zima (2004) treated the former two forms as chromosome races, i.e. as two isolated evolutionary units, one occurring in Europe and the Caucasus region (speculatively also in the Maghreb?), and the other in the Near East. Such division goes across the concept of *R. hipposideros* as a polytypic species (sensu e.g. Koopman 1994, Csorba et al. 2003), but is not in a direct contradiction with the opinions by Felten et al. (1977) and Corbet (1978). The latter concept should be slightly modified with respect to karyological evidence: the western populations of *R. hipposideros* inhabiting Europe, the Meditterranean and the western part of the Near East, assigned to the nominotypical form, should be divided along the Bosporus Strait, which seems to be the boundary between the ranges of the two chromosome races (see Zima 2004). The karyologically examined bats from Syria (NMP 48054–48056), however, possessed the Near Eastern diploid number of 58 chromosomes (Benda & Horáček 1998).

The most recent results of karyological examination of *R. hipposideros* from Turkey published by Karataş et al. (2006) showed 2n=56 in northwestern Anatolia, the same region where Zima (2004) found individuals with 2n=58. These contradictory results could suggest a chromosome

Table 7. Subspecific identification of local populations of *Rhinolophus hipposideros* (Bechstein, 1800) in particular regions of the Near East (incl. indirect mentions). [p] – the opinion considered in partim, And. = Andersen, Ell. & Mor.-Scott 1951 = Ellerman & Morrison-Scott 1951

taxon	Turkey	Levant	Cyprus	Iraq	NW Iran & Caucasus	S Iran
minimus	Andersen 1905a Andersen 1905b Andersen 1907b Saint-Girons & Caubere 1966 von Lehmann 1966 Roer & Schober 2001 Csorba et al. 2003	And. 1905a, b, 1907b Allen 1939 Ell. & Mor.-Scott 1951 Harrison 1956c Bodenheimer 1958 Lewis & Harrison 1962 Harrison 1964a Saint-Girons & Caubere 1966 Hayman & Hill 1971 Kumerloeve 1975b Atallah 1977 Qumsiyeh 1985 Harrison & Bates 1991 Qumsiyeh et al. 1992 Koopman 1994 Mendelssohn & Yom-Tov 1999 Roer & Schober 2001 Ferguson 2002 Csorba et al. 2003	Andersen 1907b [p] Ellerman & Morrison-Scott 1951 [p] Koopman 1994 Roer & Schober 2001 Csorba et al. 2003		DeBlase 1980	Etemad 1967 [p]
hipposideros	Corbet 1978 Horáček et al. 2000 [p]	Felten et al. 1977 Corbet 1978 Qumsiyeh 1996	Andersen 1907b [p] Corbet 1978		And. 1905a, b, 1907b Bobrinskoy 1925 Ognev 1927 Ell. & Mor.-Scott 1951 Strelkov 1963 Kuzjakin 1965 [p] Etemad 1967 Corbet 1978 Koopman 1994 [p] Roer & Schober 2001	
midas	Felten et al. 1977 [p] Steiner & Gaisler 1994 Horáček et al. 2000 [p]	Andersen 1918 Sanborn & Hoogstraal 1955	Andersen 1918 Ellerman & Morrison-Scott 1951 [p] Spitzenberger 1979	Cheesman 1920 Harrison 1956c Hatt 1959 Harrison 1964a Corbet 1978 Harrison & Bates 1991 Koopman 1994 Csorba et al. 2003	Kuzjakin 1965 [p] Koopman 1994 [p] Rakhmatulina 1995 Horáček et al. 2000 Csorba et al. 2003	And. 1905a, b, 1918 Ell. & Mor.-Scott 1951 Etemad 1967 [p] Corbet 1978 DeBlase 1980 Koopman 1994 Horáček et al. 2000 Csorba et al. 2003
ssp. indet.	Felten et al. 1977 [p]					

polymorphism within populations in the area close to the suggested margins of ranges of the chromosome races.

The complex problem of systematic relations in the populations of *R. hipposideros* of the Near East as well as in the whole species content could be probably solved only with the help of a profound genetic analysis. The simple comparison of three samples by Guillén Servent et al. (2003) did not provide any suggestion concerning intraspecific variation in this species, since it showed genetic distances of 3.3 to 4.6% among geographically most extreme populations (Spain, Turkey, Kirghizstan).

The comparison of skull traits introduced by Andersen (1918) and used in the detailed analysis by Felten et al. (1977), shows the following state of characters (Fig. 38, Table 6), when applied to our limited Syrian samples (only two adult females available): (1) the 'infraorbital bridge' narrow; (2) lower premolars in one line, P_2 and P_4 distant, P_3 present; (3) skull medium-sized (LCc 13.38 and 13.48 mm), of a similar size as in other Mediterranean samples and smaller than in Central European ones. According to Felten et al. (1977: 15), such state of characters classifies the Syrian samples into 'Gruppe I' identical with *R. hipposideros hipposideros*.

Rhinolophus euryale Blasius, 1853

Records. **Original data**: Al Lathiqiyeh: Qala'at Salah ad Din, castle ruins [1], 13 October 2004: obs. signs of a colony (coll. two cadavers). – Tartus: 5 km W of Qala'at al Hosn [2], 13 May 2001: net. 1 faG. – **Published data**: Dimashq: Djéroud (= Jeiroud), NE de Damas (= Dimashq), April–June 1908: 12 inds. (Trouessart & Kollmann 1923; all the remaining bats of this collection [4 ma, 1 fa] which have been available in MNHN, were identified as *R. mehelyi*, see below). – Halab: Aleppo (= Halab), April 1910: 6 m, 7 f (von Wettstein 1913; all these bats in NMW [5 ma, 1 ms, 4 fa, 3 fs, collected on 13–23 March 1910] were identified as *R. mehelyi*, see below).

Possible records (Syria *sensu lato*). **Original data**: Syria, 1860: 1 ind. (specimen in MNHN). – **Published data**: Syrien, 1 ind., ZMB (Peters 1871). – Syria, 1 ind. ad., BMNH, Dr. Staudinger (Dobson 1876, 1878). – Euphrates Valley, [1836] 1 ma, Col. Chesney (Dobson 1878, Andersen 1905b). – Syrie, 1878: 2 inds. ad. (Jentink 1888).

Distribution. **General**. *Rhinolophus euryale* is a species with a Mediterranean type of distribution (Corbet 1978, Horáček et al. 2000, Gaisler 2001b, Csorba et al. 2003). It occurs from the Maghreb and southwestern Europe, over central Europe, the European Mediterranean (incl. some of the islands), the Near East to Transcaucasia, Iran and southwestern Turkmenistan. The bats from Egypt identified originally as *R. euryale* (Anderson 1902, Flower 1932) were later re-determined as *R. mehelyi* (Sanborn & Hoogstraal 1955, Hoogstraal 1962, DeBlase 1972).

Near East. *R. euryale* occurs in the Mediterranean parts of the Near East (DeBlase 1972, Harrison & Bates 1991, Benda & Horáček 1998); it has been recorded in Turkey, Iran and the Levant. In the Near East as well as in the Maghreb, *R. euryale* reaches southern margin of its distribution range. Because three similar medium-sized horseshoe bats occur in sympatry in the Mediterranean, some records reported from the Near East can be erroneous, as shown by DeBlase (1972). Thus, some older records of *R. euryale* can be actually those of *R. mehelyi* (or *R. blasii*).

The confirmed Levantine records of *R. euryale* come from Turkey, Syria, Lebanon, Palestine, and Jordan (DeBlase 1972, Harrison & Bates 1991, our data). In Turkey, records of *R. euryale* are scattered throughout the country (Doria 1887, Strinati 1959, Osborn 1963, Çağlar 1965, Corbet & Morris 1967, DeBlase 1972, DeBlase & Martin 1973, Kock 1974, Felten et al. 1977, von Helversen 1989, Albayrak 1990a, 1993a, 2003, Obuch 1994, Steiner & Gaisler 1994, Hasbenli 1997, Benda & Horáček 1998, Özgül et al. 2000, Yiğit et al. 2006), however, there is a gap in its distribution in the central parts of Anatolia (Benda & Horáček 1998). In the Turkish regions adjacent to the Syrian border, *R. euryale* has been recorded in Hatay (Hasbenli 1997) as well as in the southern part of the Armenian Taurus Mts (DeBlase & Martin 1973, Albayrak 1990a, Obuch 1994).

In Lebanon, records of *R. euryale* were reported mostly from the coastal region (Tristram 1884, Lewis & Harrison 1962, Harrison 1964a, Atallah 1970, Tohmé & Tohmé 1985); most of them (except for that by Tristram 1884, which remains doubtful) were confirmed by consequent analyses (DeBlase 1972, Harrison & Bates 1991) or are quite clear from the measurements given (Tohmé & Tohmé 1985).

In Palestine, *R. euryale* has been reported by many authors (Tristram 1884, Andersen & Matschie 1904, Aharoni 1930, Bodenheimer 1935, Theodor & Moscona 1954, Bodenheimer 1958, Harrison 1964a, Theodor 1967, Atallah 1977), however, some of these records have been doubted (DeBlase 1972). Concerning the Palestinian territory, only the bats from Jerusalem, Rosh HaNiqra, and the Galilee were re-identified as *R. euryale* (DeBlase 1972, Felten et al. 1977, Harrison & Bates 1991). Mendelssohn & Yom-Tov (1999) concluded that this bat was primarily distributed all over the Mediterranean zone of Palestine, while in the present time it is extremely rare there.

In Jordan, two records of *R. euryale* have been published; from Jerash (Harrison 1972) and the Dibbine NP (Qumsiyeh 1985). However, only the latter one was later confirmed (Harrison & Bates 1991, Qumsiyeh 1996).

In Iraq, *R. euryale* was reported from two sites in the southwestern part of the country (Niazi 1976). According to the measurements given to one of them, Harrison & Bates (1991) considered both records as of *R. mehelyi*. The records of *R. euryale* in western Iran come only from higher areas of the Zagros Mts and the Armenian Highlands (Etemad 1967, Lay 1967, DeBlase 1971).

From Cyprus *R. euryale* was referred by Harrison (1964a), Theodor (1967) and Boye et al. (1990). However, no reference specimen from this island is available and thus, the occurrence of this species still needs to be confirmed.

Syria (Fig. 39). *R. euryale* is a rare bat in Syria, only two confirmed records are available (Table 1). The first specimens of this species coming from 'Syria' were published by Peters (1871), Dobson (1876, 1878), and Jentink (1888). Consequently, several authors mentioned 'Syria' as a part of the distribution range of *R. euryale* (Anderson 1881, 1902, Trouessart 1897, Méhely 1900, Palacký 1902). However, no later reference which would comment the specimens and/or records (their fate, clear origin or clear species identification) made by these former authors is available in the literature (see e.g. Andersen & Matschie 1904, Harrison 1964a, DeBlase 1972, Kumerloeve 1975b, Harrison & Bates 1991).

The first accurate records attributed to *R. euryale* from the present-day territory of Syria were published by von Wettstein (1913) and Trouessart & Kollmann (1923). Von Wettstein (1913: 465) mentioned "13 Exemplaren aus Aleppo" of *R. euryale*. However, all these individuals represent *R. mehelyi* according to their skull measurements. Trouessart & Kollmann (1923) mentioned "douze spécimens dans l'alcool" of *R. euryale* from Djéroud (= Jeiroud). Similarly as in the previous case, rest of these individuals, which is still deposited in MNHN has been attributed to *R. mehelyi* (see below for details).

Thus, both published records of *R. euryale* from Syria have proved to be wrong. However, our two present records [1, 2] confirm an occurrence of *R. euryale* in Syria *proper*. Another old specimen was found to be deposited in MNHN (1860-487D) and labelled '*R. euryale*, Syrie'. This bat (stuffed specimen, skull inside) of an approximate origin only, was preliminary identified as *R. euryale*, only using wing measurements, because the noseleaf of this specimen has been deformed by dry preparation and the skull measurements are not available. Thus, confusion with *R. mehelyi* is still possible in this specimen, although its wing measurements and ratios show rather *R. euryale*.

The two new records [1, 2] come from the Mediterranean woodland part of Syria, the hilly landscape of the Jebel An Nusariyah Mts. Based on rather scarce records of three medium-sized horseshoe bat species in Syria, *R. euryale* seems to be the rarest one. This state is similar with that known from the southern Balkans and some areas of North Africa (Hanák et al. 2001, Benda et al. 2003b, 2004d) where the records of *R. blasii* are more numerous than those of *R. euryale*.

Field notes. The only roost of *Rhinolophus euryale* found in Syria was a basement room of the Tower of the Qala'at Salah ad Din castle (Fig. 40) where traces of a colony were detected. *R. ferrumequinum*, *R. hipposideros*, *M. nattereri*, and *M. emarginatus* were associated species in this roost, out of them only *R. ferrumequinum* was found to share the same room of the castle. The species was netted only at one place in Syria, in an orchard ca. 5 km west of Qala'at al Hosn (together with *R. hipposideros* and *P. kuhlii*). It was a pregnant female collected on 13 May 2001, containing one foetus of crown-rump length of 23.4 mm. Although *R. euryale* has been found in owls diet in some parts of the Middle East (Obuch 1994, unpubl.), no similar data are available from Syria.

Material examined. 1 fa (NMP 49985 [S+A]), 5 km W Qala'at al Hosn, 13 May 2001, leg. R. Lučan; – 1 ind. (NMP 90343 [S]), Qala'at Salah ad Din, 13 October 2004, leg. R. Lučan. – 1 ind. (MNHN 1860-487D [B, skull inside]), Syria, 1860, leg. Blanche.

Morphology. See Table 8 and Appendix III for biometric data on the Syrian specimens of *Rhinolophus euryale*.

Identification. Several authors reported the occurrence of various species of medium-sized horseshoe bats (*R. euryale*, *R. blasii*, *R. mehelyi*) in Syria (both Syria *s.l.* and Syria *proper*) (see

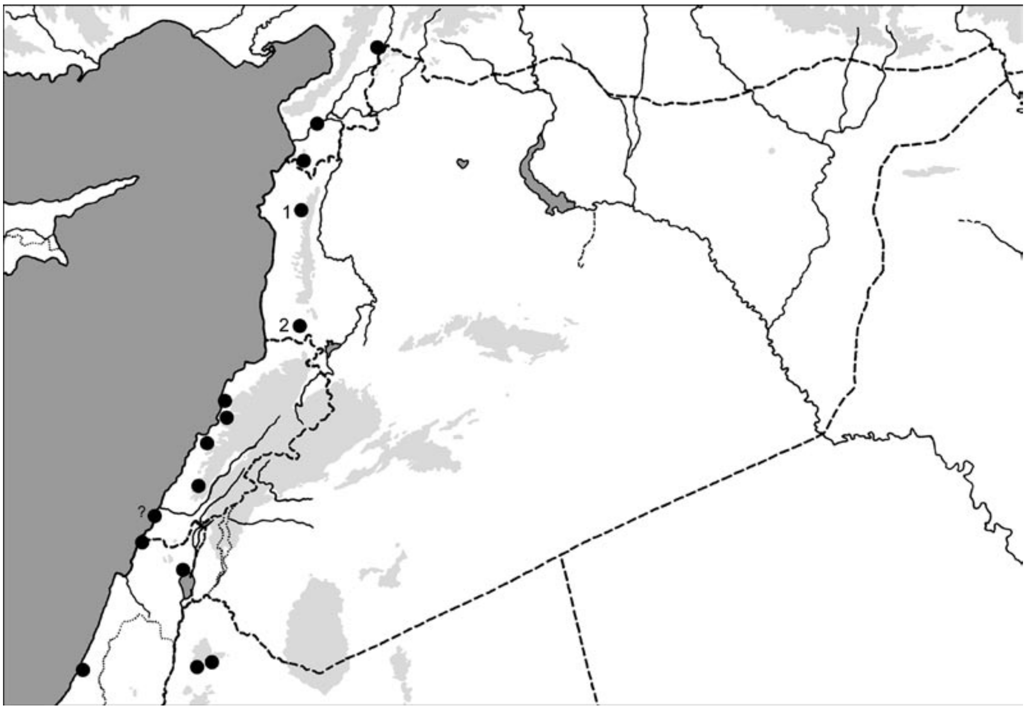


Fig. 39. Records of *Rhinolophus euryale* Blasius, 1853 in Syria and surrounding areas.

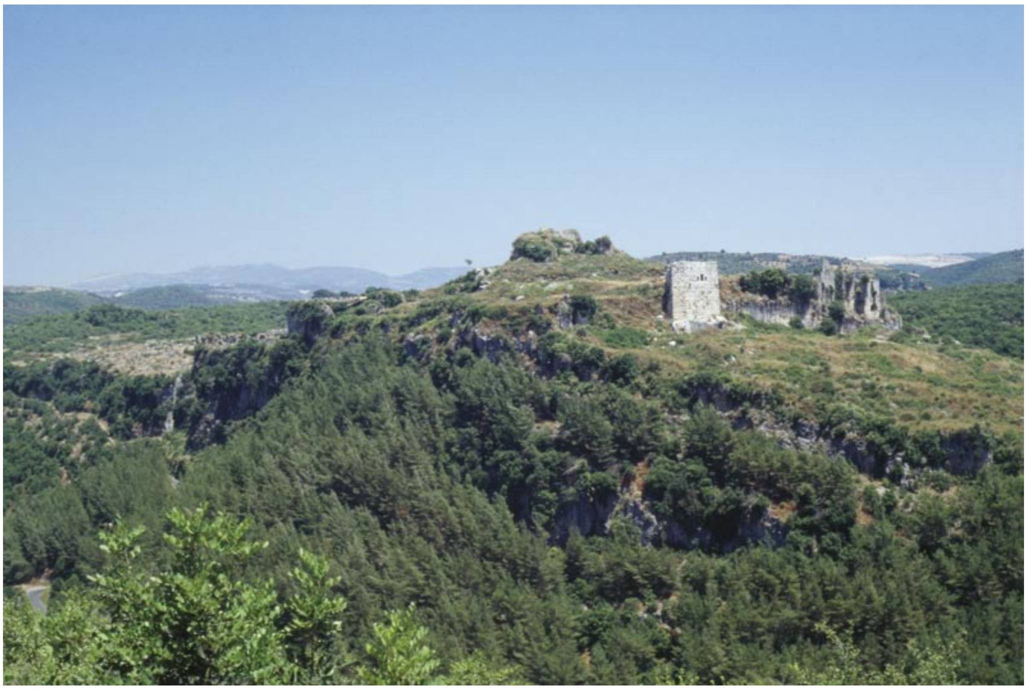


Fig. 40. Ruins of the mediaeval castle of Qala'at Salah ad Din located in forested landscape of northern part of the Jebel An Nusariyah Mts. The area of the castle and its close surroundings hosts the richest bat community found in the Mediterranean part of Syria (*Rhinolophus ferrumequinum*, *R. hipposideros*, *R. euryale*, *Myotis blythii*, *M. nattereri*, *M. emarginatus*, *Eptesicus anatolicus*, *Pipistrellus pipistrellus*, *P. kuhlii*, and *Tadarida teniotis*) (photo by P. Benda).

Records). Because earlier researches sometimes made mistakes in the identification of these species (see DeBlase 1972, Cockrum 1976), and also an other material appeared, we carried out a re-identification of most of the available museum material of medium-sized horseshoe bats from Syria with the help of an extensive set of comparative material coming from all parts of southwestern Palaearctic (see Appendix II).

Besides the old material of unclear origin designated as 'Syria' (= Syria *s.l.*) mentioned by elder authors (Peters 1871, Dobson 1876, 1878, Nehring 1886, Jentink 1888, Andersen 1906), which was mostly not found by later researchers in the respective collections, two larger samples of medium-sized horseshoe bats were reported from Syria. Von Wettstein (1913) mentioned 27 individuals from Aleppo (= Halab) determined by him to two species, *R. euryale* (13) and *R. blasii* (14), which were collected by V. Pietschmann during his 'Mesopotamien-Expedition' in 1910. These specimens are still deposited in NMW under the numbers 21962–21988 (specimens in alcohol, skulls extracted) together with another material of five specimens from Aleppo collected also by V. Pietschmann, but during the subsequent 'Armenien-Expedition' in 1914 (NMW 21989–21992 [S+A], 21993 [A]) and remaining unpublished. Trouessart & Kollmann (1923) reported a dozen specimens of *R. euryale* from Djéroud (= Jeiroud) collected by Henri Gadeau de Kerville in 1908. Some of these specimens (four males, one female) are deposited in MNHN under the numbers 1911-580A–E (complete specimens in alcohol). Apart from these two sets,

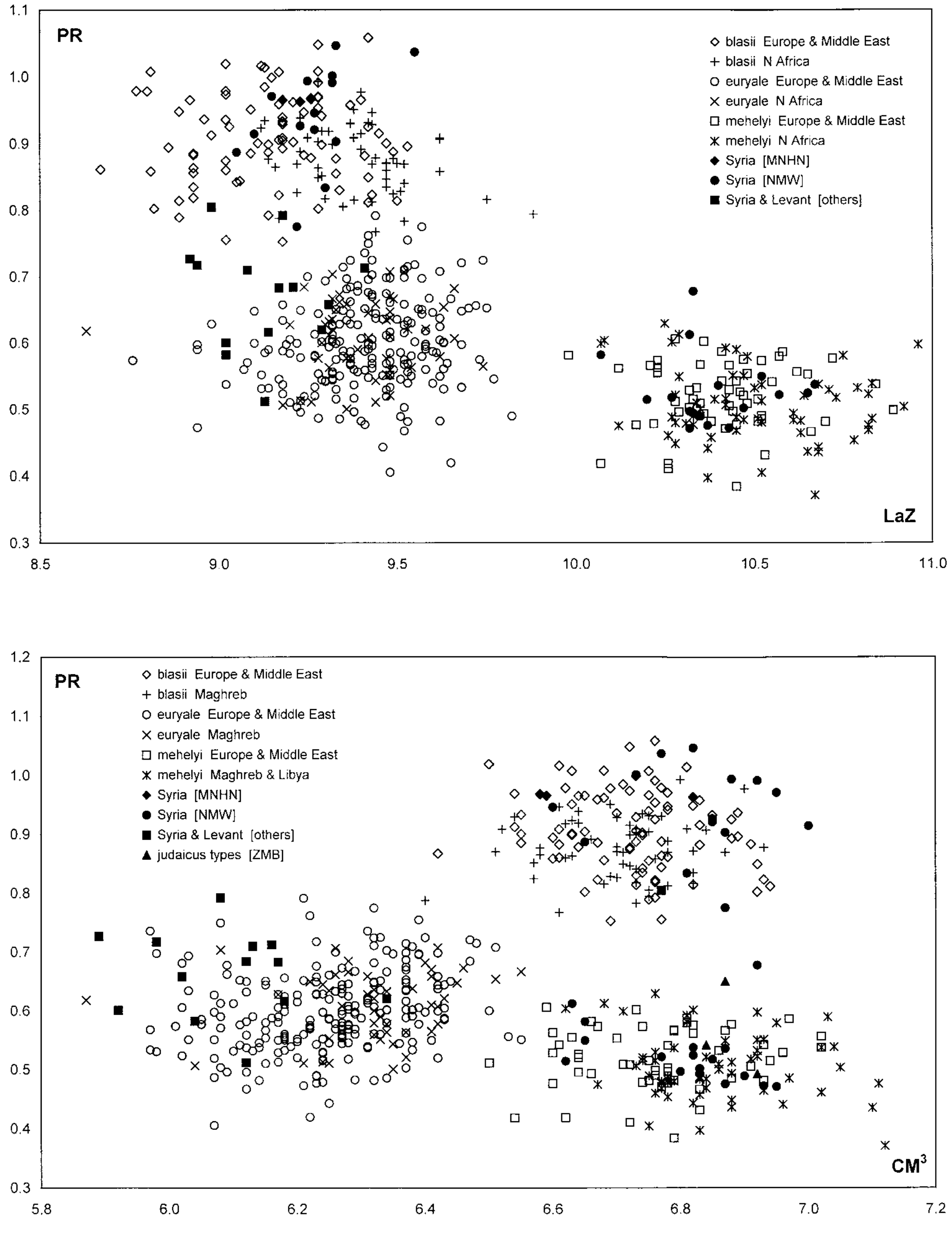
Table 8. Basic biometric data on examined Syrian and comparative samples of *Rhinolophus euryale* Blasius, 1853. For abbreviations see pp. 10, 11

	Levant					Iran					Maghreb				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	13	**45.68**	44.0	47.7	1.122	7	**47.29**	46.0	48.0	0.951	9	**47.03**	44.9	48.3	1.251
LCr	8	**18.56**	17.95	18.91	0.296	3	**19.37**	19.18	19.58	0.201	45	**18.99**	17.87	19.54	0.331
LCc	14	**15.70**	15.27	16.19	0.232	7	**16.41**	16.10	16.74	0.197	49	**16.30**	15.33	16.74	0.246
LaZ	14	**9.12**	8.79	9.41	0.168	7	**9.51**	9.35	9.68	0.113	49	**9.40**	8.63	9.74	0.169
LaI	14	**2.24**	2.03	2.42	0.119	7	**2.33**	2.25	2.42	0.063	49	**2.29**	2.02	2.42	0.082
LaN	14	**8.13**	7.93	8.38	0.120	7	**8.39**	8.18	8.68	0.154	49	**8.36**	7.96	8.64	0.145
ANc	14	**5.88**	5.42	6.11	0.189	7	**6.00**	5.87	6.26	0.142	49	**5.94**	5.70	6.27	0.131
CC	14	**4.40**	4.18	4.57	0.105	6	**4.63**	4.47	4.73	0.110	49	**4.64**	4.43	4.92	0.112
M^3M^3	14	**6.42**	6.17	6.63	0.134	7	**6.76**	6.53	6.97	0.151	49	**6.60**	6.22	6.87	0.120
CM^3	14	**6.08**	5.89	6.34	0.118	7	**6.36**	6.22	6.47	0.077	49	**6.32**	5.87	6.55	0.117
LMd	13	**11.30**	11.13	11.54	0.158	7	**11.89**	11.68	12.08	0.144	49	**11.86**	10.98	12.19	0.225
ACo	13	**2.47**	2.32	2.62	0.099	7	**2.56**	2.52	2.64	0.040	49	**2.63**	2.25	2.91	0.135
CM_3	13	**6.43**	6.27	6.58	0.099	7	**6.76**	6.68	6.83	0.055	48	**6.71**	6.35	6.93	0.118
PR	13	**0.663**	0.512	0.792	0.074	7	**0.736**	0.697	0.775	0.029	49	**0.610**	0.500	0.707	0.057

	Central Europe					Southeastern Europe					Southwestern Europe				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	3	**47.70**	47.0	48.8	0.964	152	**48.54**	44.2	50.9	1.332	13	**47.52**	46.6	48.6	0.520
LCr	17	**19.32**	18.58	20.01	0.298	124	**18.93**	18.12	19.72	0.275	14	**18.97**	18.64	19.27	0.190
LCc	37	**16.40**	15.84	17.11	0.260	132	**16.22**	15.70	16.75	0.204	16	**16.24**	15.92	16.59	0.185
LaZ	37	**9.46**	9.18	9.75	0.134	145	**9.39**	8.76	9.82	0.184	16	**9.44**	9.18	9.68	0.133
LaI	37	**2.30**	2.12	2.43	0.086	158	**2.21**	1.92	2.47	0.108	16	**2.29**	2.08	2.48	0.129
LaN	37	**8.33**	8.06	8.69	0.131	150	**8.28**	6.02	8.82	0.277	16	**8.41**	8.05	8.68	0.165
ANc	36	**5.95**	5.61	6.34	0.174	130	**5.92**	5.45	6.34	0.153	16	**5.92**	5.75	6.18	0.108
CC	36	**4.61**	4.42	4.80	0.106	154	**4.54**	3.42	4.83	0.183	16	**4.56**	4.41	4.75	0.087
M^3M^3	37	**6.69**	6.34	6.97	0.147	159	**6.58**	5.13	6.87	0.195	15	**6.59**	6.36	6.83	0.116
CM^3	37	**6.34**	6.09	6.76	0.113	161	**6.22**	5.69	6.55	0.125	16	**6.23**	6.02	6.39	0.127
LMd	37	**11.78**	11.28	12.24	0.224	158	**11.69**	10.82	12.22	0.191	16	**11.81**	11.49	12.35	0.248
ACo	37	**2.53**	2.26	2.85	0.120	157	**2.52**	2.22	2.77	0.106	15	**2.59**	2.42	2.78	0.110
CM_3	37	**6.73**	6.53	7.30	0.136	158	**6.60**	5.91	6.92	0.128	16	**6.63**	6.48	6.85	0.104
PR	37	**0.649**	0.539	0.858	0.065	161	**0.582**	0.406	0.870	0.066	16	**0.613**	0.482	0.699	0.062

some other specimens were found in MNHN; two individuals from Lattakié (= Al Lathiqiyeh) identified as *R. blasii*: one collected by M. Deyrolles before 1876 (MNHN 1876-339 [S+A]), another by H. Gadeau de Kerville (1985-894 [S+A]), and a set of eight specimens signed only 'Syrie' and partly determined as *R. blasii* and partly as *R. euryale* (MNHN 1860-487A–G [B, skulls inside], 1860, leg. Blanche; MNHN 1921-86 [S+A], leg. D. Siépi). One male individual in alcohol, labelled as '*R. clivosus*, Syrien, 1894, ded. Schlüter, Halle' was found in the Bonn collection (ZFMK 79.627 [S+A]). In addition, two NMP individuals (49985 [S+A], 90343 [S]) collected recently in Syria (preliminarily identified as *R. euryale*) as well as a SMF specimen of *R. euryale* from Palestine (SMF 20454 [S], see Felten et al. 1977) and AUB series of seven *R. euryale* from Lebanon (AUB M160, M163, M166, M1167–M1170 [S+B], see DeBlase 1972) were also used in the following comparison.

With the exception of several MNHN specimens (series 1860-487 [B] and 1911-580 [A]), all available museum individuals of medium-sized *Rhinolophus* species were prepared with extracted skulls. According to their skull and teeth measurements (Miller 1912, DeBlase 1972, Harrison



Figs. 41, 42. Bivariate plots of examined Syrian and comparative samples of the medium-sized species of the genus *Rhinolophus* Lacepède, 1799. 41 (above) – zygomatic width (LaZ) against the premolar ratio (PR). 42 (below) – length of upper tooth-row (CM^3) against the premolar ratio (PR). PR represents a ratio of squares of the first (P^2) and third (P^4) lower premolars (for details see text).

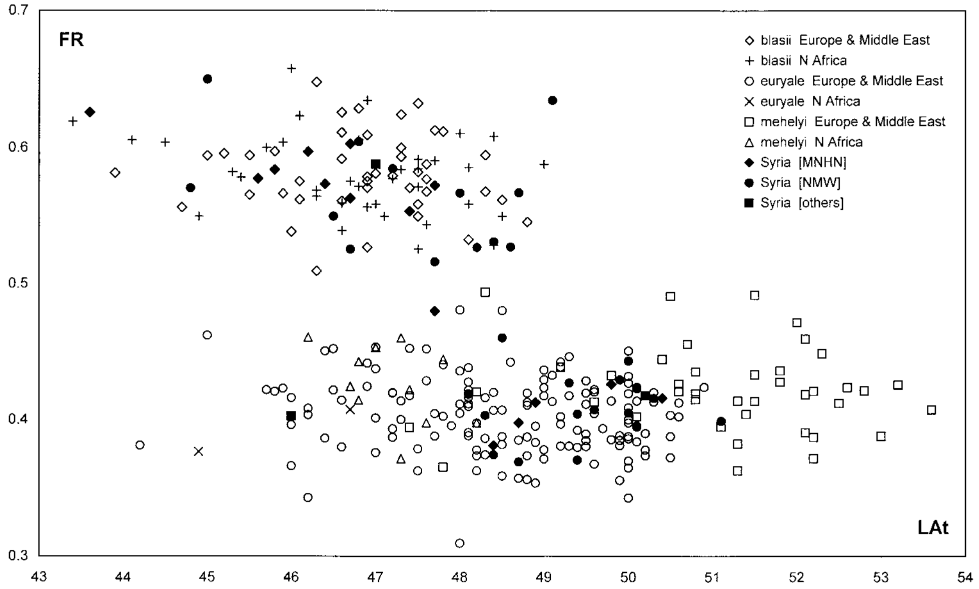


Fig. 43. Bivariate plot of examined Syrian and comparative samples of the medium-sized species of the genus *Rhinolophus* Lacepède, 1799: forearm length (LAt) against the ratio of the proximal and medial phalangi lengths of the fourth wing finger (FR).

& Bates 1991, etc.), the species identification was very easy as shown in Figs. 41, 42. We used two dimensions, which reflected length and width of facial parts of the skull (CM^3 and LaZ) and compared them with the 'premolar ratio' (PR), i.e. ratio of P$_2$ and P$_4$ crown areas [PR = (length of P$_2$ × width of P$_2$) / (length of P$_4$ × width of P$_4$)]. The premolar ratio separates out samples of *R. blasii* (PR 0.75–1.06) and the other two species (PR 0.37–0.79), while comparison of LaZ as well as CM^3 can well differentiate between *R. euryale* and *R. mehelyi* (see Tables 8, 11). Although in all three dimensions a small overlap in marginal values exists, the combination of the three values per individual specimen clearly shows its specific affiliation (contra cf. Csorba et al. 2003: 16).

This simple comparison of three dimensions (Figs. 41, 42) confirmed von Wettstein's identification of *R. blasii* among NMW specimens from Aleppo (series 21962–21975). However, the remaining individuals of the Pietschmann's collection in NMW represent *R. mehelyi* (series 21976–21992), while *R. euryale* does not occur in this set. All three available skulls from MNHN specimens represent *R. blasii* (MNHN 1876-339, 1921-86, 1985-894). Both NMP specimens were shown to be *R. euryale*, whereas the ZFMK specimen of '*R. clivosus*' (79.627) is actually *R. blasii*.

As pointed out above, two MNHN series of medium-sized horseshoe bats originating in Syria are represented by specimens without extracted skulls. These bats were identified according to their wing dimensions and/or morphology of the noseleaf. The series MNHN 1860-487 consists of seven dry stuffed preparations containg skulls inside the skin and unavailable for measurement. In the collection, three individuals of the series, MNHN 1860-487A–C, were identified as *R. blasii*, while the rest (1860-487D–G) as *R. euryale*. As their noseleafs are dried and deformed, only a comparison of wing dimensions enabled to identify bats from this series. We examined the ratio between first two phalangi of the fourth wing finger (a character well differentiating *R.*

blasii from other species, see Fig. 43 and/or Blasius 1857, Miller 1912, Felten et al. 1977, DeBlase 1980, Kryštufek & Đulić 2001, Csorba et al. 2003, etc.) and compared these individuals with other dry preparations of all three respective species (Fig. 43, Table 9). According to this effective comparison, most of the series is created by *R. blasii* and only one individual (MNHN 1860-487D) is identified as *R. euryale*.

The second MNHN series without skulls available (1911-580) consists of five complete bats in alcohol identified by Trouessart & Kollmann (1923) as *R. euryale*. According to their IV. finger phalangi ratio (0.38–0.43) and widths of the horseshoe (5.8–6.3 mm), these bats apparently belong to the group *R. euryale / R. mehelyi*. Since all examined individuals of *R. euryale* from the Levant (identified according to their skull characters) are very small (LAt 44.0–47.7 mm, versus MNHN series 48.4–50.4 mm) and the noseleafs of the respective bats have rather blunt tips of sellae and abruptly pointed lancets, we consider this series to be *R. mehelyi* most probably (see Table 9).

TAXONOMY. *Rhinolophus euryale* was formerly considered a polytypic species, comprising four to nine subspecies within its distribution range (Andersen 1905b, Ellerman & Morrison-Scott 1951, Koopman 1994, Ibáñez in Mitchell-Jones et al. 1999). On the other hand, Corbet (1978) and Gaisler (2001b) regarded the species monotypic. However, the most recent authors (Csorba et al. 2003, Simmons 2005, cf. Horáček et al. 2000) recognised two subspecies within the species rank; viz. *R. e. euryale* Blasius, 1853 (terra typica: Mailand [= Milan, Italy]) and *R. e. judaicus* Andersen et Matschie, 1904 (t.t.: Höhle Adullam bei Jerusalem [= Mogharet Khureitun, 10 km SE of Jerusalem, Palestine; Atallah 1977]).

Most authors considered the populations of *R. euryale* from the Levant and surrounding areas to belong to the form *judaicus*, either at the subspecies (Andersen 1905a, b, von Wettstein 1913, Allen 1939, Ellerman & Morrison-Scott 1951, Bodenheimer 1958, Lewis & Harrison 1962, Harrison 1956c, 1964a, Hayman & Hill 1971, Niazi 1976, Atallah 1977, Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999, Ferguson 2002, Csorba et al. 2003) or even at the species level (Andersen & Matschie 1904, Kinnear 1916, Bodenheimer 1935). Syrian populations of *R. euryale* should also belong to this form (cf. von Wettstein 1913, Harrison 1964a, Atallah 1977, Csorba et al. 2003).

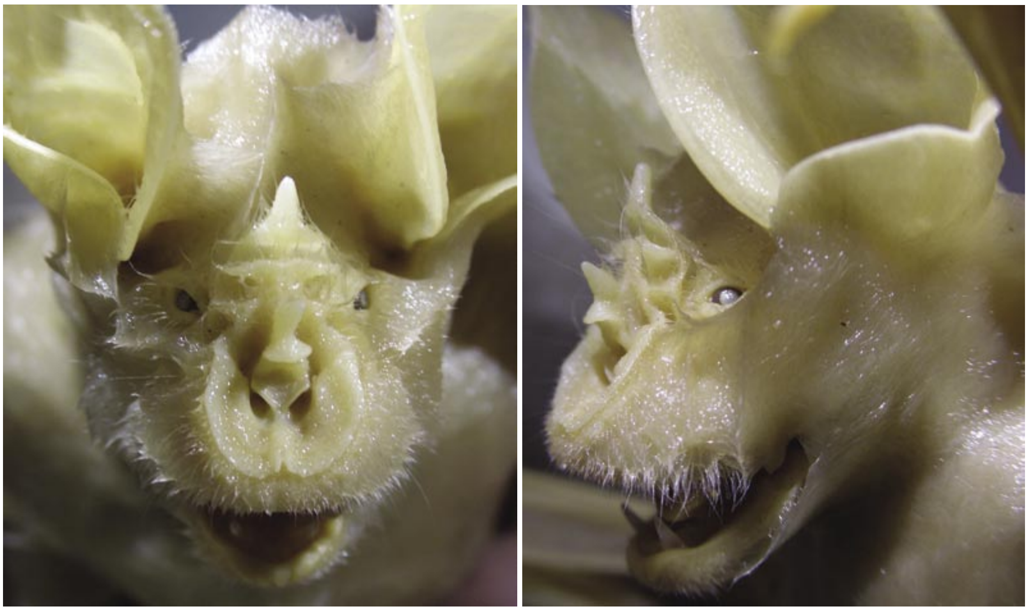
The form *judaicus* was described as a separate species of the subgenus *Euryalus* Matschie, 1901 by Andersen & Matschie (1904), i.e. in fact as *Rhinolophus* (*Euryalus*) *judaicus* although in confusing original combination *Euryalus judaicus*, on the basis of nine specimens coming from the Jerusalem area, Palestine. Andersen & Matschie (1904) gave some external measurements and characters describing this species; for the forearm length (LAt) they showed the range 47.5–51.0 mm (two males 47.5, 49.5 mm; seven females 48–51 mm; type specimen 51 mm; mean from 9 specimens 49.8 mm). Although these data mostly conform with the LAt range of *R. euryale* from Europe and only slightly oversize them (see e.g. Miller 1912: 44.6–49.0 mm; Felten et al. 1977: 45–50 mm, mean 47.1 mm, n=106; Gaisler 2001b: 46.5–50.0 mm, mean 48.4 mm, n=29; Benda et al. 2003b: 45.0–52.5 mm, mean 48.7 mm, n=156), they are much over the range given for the Levantine samples of *R. euryale* by Harrison & Bates (1991): 43–47 mm (mean 45.7 mm, n=18), and well agree with the samples of *R. mehelyi* mentioned by these authors: 48–51 mm (mean 49.4 mm, n=8). This comparison of published data suggests that the name *R.* (*E.*) *judaicus* could be a synonym of the name *R. mehelyi* Matschie, 1901 rather than of *R. euryale* Blasius, 1853.

For this reason, Turni & Kock (in press) re-examined the holotype specimen of *R.* (*E.*) *judaicus* and according to its size (LAt 50.9 mm) and shape of its noseleaf ("lancet abruptly narrowed above the middle") they really found it to belong to *R. mehelyi* (as well as most of the rest of the type series ZMB 12979–12986, with an exception of ZMB 12982 which pertains to *Rhinolophus blasii* Peters, 1866). We also used an opportunity to examine part of the type series of *R.* (*E.*)

judaicus in ZMB, i.e. three specimens ZMB 12978 (holotype), 12979 and 12984 (paratypes). Since these specimens are alcohol preparations with skulls not extracted, we took only several dental characters. However, they enabled to identify all these specimens as belonging to *R. mehelyi* (see Table 10 and Fig. 42), similarly as the noseleaf shape in the holotype shows (Figs. 44, 45; as also illustrated by Turni & Kock in press). These comparisons showed clearly that the name *R.* (*E.*) *judaicus* Andersen et Matschie, 1904 is a junior synonym of the name *R. mehelyi* and is not available for designation of the Levantine populations of *R. euryale* as suggested by many of the above mentioned authors.

Skull measurements of our samples of *R. euryale* from the Levant (two Syrian bats, one from Palestine, 11 from Lebanon) showed their position on the lower margin of the species size range (Fig. 46). Although the number of specimens is rather low for a relevant conclusion, this position suggests a possible separate taxonomic rank (see also Felten et al. 1977). However, more museum specimens are needed to be able to confirm that the Levantine populations really create a smaller form of *R. euryale*, or to show that our samples are only smaller representatives of a population whose size range is indifferent from other Mediterranean ones.

Popov & Ivanova (2002) and Špoutil (2003) found cline shifts in body size among the Balkan populations dependent to a local climate. Samples coming from relatively colder regions are slightly larger than those from relatively warmer areas. Such phenomenon could be an alternative explanation for the small size of the Levantine samples of *R. euryale*, which are the southernmost living populations of this species in the eastern Mediterranean and thus possibly inhabiting the warmest region of this part of the species distribution range. However, more numerous museum samples not only from the Levant but also from neighbouring areas are also necessary for such statement.



Figs. 44, 45. Noseleaf and face of the holotype specimen of *Rhinolophus* (*Euryalus*) *judaicus* Andersen et Matschie, 1904 (ZMB 129978). 44 (left) – frontal view. 45 (right) – semi-lateral view. (Photo by I. Horáček.)

Table 9. Horseshoe and wing measurements of different preparations of the medium-sized horseshoe bats (*Rhinolophus* Lacepède, 1799) from Syria and of the comparative samples. For abbreviations see pp. 10, 11. A = alcoholic preparation, B = dry skin (balg)

R. euryale	Syria [A]		comparative samples [A]					Syria [B]		comparative samples [B]				
	n		n	**M**	min	max	SD	n		n	**M**	min	max	SD
LaFE	1	6.3	81	**6.51**	5.6	7.3	0.383	0	–	–	–	–	–	–
LAt	1	46.0	83	**49.02**	44.9	53.0	1.224	1	47.70	39	**47.48**	44.2	50.5	1.308
V.D1	1	9.2	84	**10.46**	9.4	11.7	0.423	1	10.70	35	**10.49**	9.8	11.1	0.334
V.D2	1	11.1	84	**12.45**	11.0	14.3	0.730	1	10.10	34	**12.09**	7.1	17.5	1.416
IV.D1	1	6.2	84	**7.00**	5.8	8.3	0.456	1	7.20	70	**6.78**	4.8	7.6	0.467
IV.D2	1	15.4	83	**17.53**	14.6	20.0	0.877	1	15.00	69	**16.68**	14.2	18.3	0.94
III.D1	1	12.8	84	**14.09**	12.7	15.3	0.587	0	–	35	**13.83**	13.1	14.8	0.444
III.D2	1	24.1	82	**26.67**	23.5	30.0	1.170	0	–	35	**25.40**	22.6	27.0	1.007
IV.FR	1	0.403	83	**0.400**	0.343	0.452	0.025	1	0.480	69	**0.407**	0.310	0.481	0.030
V.FR	1	0.829	84	**0.842**	0.701	1.009	0.053	1	1.059	34	**0.881**	0.606	1.521	0.133

R. mehelyi	Syria [A]					comparative samples [A]					comparative samples [B]				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LaFE	21	**6.41**	5.8	6.9	0.311	4	**6.50**	6.0	6.9	0.469	–	–	–	–	–
LAt	22	**49.44**	48.1	51.1	0.828	4	**49.98**	47.4	52.5	2.750	48	**50.30**	46.2	53.6	2.046
V.D1	5	**10.66**	10.5	10.9	0.152	4	**11.05**	10.2	11.9	0.874	48	**11.53**	9.9	13.0	0.599
V.D2	5	**12.06**	11.7	12.5	0.365	4	**12.80**	12.0	13.6	0.698	47	**12.02**	9.5	13.5	0.955
IV.D1	22	**7.43**	6.2	8.2	0.487	4	**7.05**	6.5	8.2	0.777	48	**7.71**	6.5	8.9	0.483
IV.D2	22	**18.16**	16.7	19.5	0.733	4	**18.25**	17.0	19.9	1.223	48	**18.14**	16.0	19.8	1.041
III.D1	0	–	–	–	–	4	**14.45**	13.4	15.6	0.915	48	**14.25**	12.8	15.5	0.621
III.D2	0	–	–	–	–	4	**27.60**	25.1	30.0	2.246	48	**27.78**	24.3	30.1	1.385
IV.FR	22	**0.409**	0.369	0.460	0.023	4	**0.386**	0.365	0.412	0.021	48	**0.426**	0.363	0.494	0.029
V.FR	4	**0.883**	0.840	0.924	0.038	4	**0.864**	0.779	0.936	0.065	47	**0.964**	0.872	1.122	0.063

R. blasii	Syria [A]					comparative samples [A]				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LaFE	18	**7.61**	7.10	8.10	0.307	52	**7.55**	6.1	8.6	0.535
LAt	18	**47.23**	44.8	49.1	1.213	53	**47.04**	43.9	49.0	1.029
V.D1	18	**11.18**	10.5	12.3	0.467	54	**11.26**	10.3	12.2	0.422
V.D2	18	**12.01**	11.4	13.2	0.432	54	**12.15**	10.5	14.0	0.803
IV.D1	18	**8.45**	7.8	9.2	0.382	54	**8.58**	7.9	9.3	0.349
IV.D2	17	**14.96**	13.9	16.2	0.613	54	**14.94**	13.8	16.2	0.547
III.D1	15	**15.38**	14.6	16.1	0.460	54	**15.29**	13.5	16.3	0.534
III.D2	15	**23.68**	20.2	25.1	1.169	54	**23.50**	20.6	24.8	0.905
IV.FR	17	**0.567**	0.516	0.650	0.038	54	**0.575**	0.509	0.648	0.030
V.FR	18	**0.932**	0.875	1.051	0.045	54	**0.931**	0.779	1.080	0.070

R. blasii	Syria [B]					comparative samples [B]				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	6	**46.03**	43.6	47.7	1.378	26	**46.33**	43.4	48.4	1.260
V.D1	6	**11.33**	10.8	11.7	0.339	26	**11.44**	10.7	12.1	0.361
V.D2	6	**11.67**	11.1	12.4	0.509	26	**11.60**	10.5	12.7	0.523
IV.D1	6	**8.55**	8.2	8.8	0.243	26	**8.66**	7.9	9.8	0.422
IV.D2	6	**14.47**	13.9	15.2	0.557	26	**14.57**	13.6	15.6	0.476
III.D1	0	–	–	–	–	25	**15.18**	13.5	16.0	0.478
III.D2	0	–	–	–	–	24	**23.08**	21.0	24.2	0.790
IV.FR	6	**0.591**	0.572	0.626	0.021	26	**0.595**	0.550	0.658	0.024
V.FR	6	**0.972**	0.944	1.000	0.022	26	**0.988**	0.915	1.114	0.047

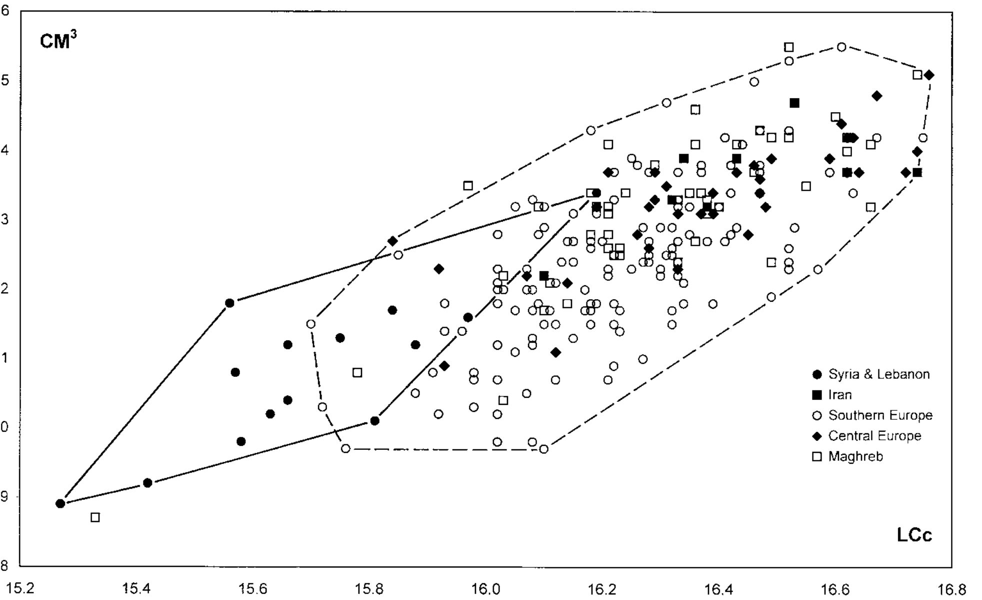


Fig. 46. Bivariate plot of examined Syrian and comparative samples of *Rhinolophus euryale* Blasius, 1853: condylocanine length of skull (LCc) against the length of upper tooth-row (CM³). Explanation: bold-lined polygon = Levantine samples (n=14); dashed polygon = European samples (n=185), i.e. of *R. e. euryale*.

Nevertheless, according to our comparison (Fig. 46) and the results reported by other authors (Felten et al. 1977, DeBlase 1980), the populations from other parts of the Near East (Turkey, Caucasus, Iran) do not differ in dimensions from the European or Maghrebian ones and are considered to be a part of nominotypical populations. Therefore, no name in the synonymy of *R. euryale* is available for a possible designation of the small Levantine form (Ellerman & Morrison-Scott 1951, Koopman 1993, Borisenko & Pavlinov 1995, Csorba et al. 2003, Simmons 2005). There are four names from Europe (*euryale*, *toscanus*, *atlanticus*, *cabrerae*), three from the Maghreb (? *algirus*, *barbarus*, *meridionalis*) and one from the Caucasus (*nordmanni*), but none from the Near East *proper*.

The last mentioned name, *R. e. nordmanni* Satunin', 1912 (t.t.: near Pavlovskoe, Suhum region [= Sukhumi, Abkhazia, NW Georgia]) is the only synonym of *R. euryale* coming from an area close to the Middle East (western part of the Greater Caucasus Mts). It was described on the basis of darker coloration in three specimens, whose size did not differ from the typical form (LAt 49 mm in the holotype) (Satunin' 1912). Satunin' (1914) considered this form a subspecies of the Colchic region only, i.e. of the northwestern part of Transcaucasia (in other parts of the Caucasus region as well as in S Europe, N Africa, and Asia Minor, he mentioned the nominotypical form). Bianki (1917) doubted the validity of the ssp. *nordmanni*, which he considered to be only a colour morph, but Ognev (1927) accepted Satunin's (1914) opinion. Ognev (1928) and later Kuzjakin (1950, 1965) rather doubted the form *nordmanni* as a subspecies, while Ellerman & Morrison-Scott (1951) listed it as a full subspecies of *R. euryale* among four others. According to Felten et al. (1977), the form *nordmanni* still was to be proved, but they assigned the populations from Turkey and Iran to the nominotypical form, similarly as DeBlase (1980). However, Strelkov (1981) and

Table 10. Biometric data on the examined type specimens of *Rhinolophus* (*Euryalus*) *judaicus* Andersen et Matschie, 1904. For abbreviations see pp. 10, 11. The holotype specimen is uderlined

No.	sex	age	LAt	LA	LaFe	CC	M^3M^3	CM^3	PR	III.D1	III.D2	V.D1	V.D2	IV.D1	IV.D2
BZM 12978	f	a	51.0	21.3	6.4	5.12	7.55	6.87	0.650	14.0	29.0	11.3	12.4	7.5	18.3
BZM 12979	f	a	50.6	20.8	6.4	5.11	7.21	6.92	0.493	15.6	28.5	11.8	12.3	8.6	18.5
BZM 12984	f	a	50.5	20.1	6.8	5.17	7.42	6.84	0.542	14.1	28.7	11.5	11.5	7.7	18.4

Gazaryan & Ivanitsky (2005) did not accept the subspecies *nordmanni* at all, and the same view was brought out also by Koopman (1994), Horáček et al. (2000), Gaisler (2001b), Csorba et al. (2003), and Simmons (2005). According to this prevailing conclusion as well as our comparison of the Near East samples (Table 8, Fig. 46), we consider the name *nordmanni* to be a junior synonym of the nominotypical form (cf. Bianki 1917, Gazaryan & Ivanitsky 2005) and thus, unavailable for designation of the Levantine (or any other) populations of *R. euryale* on the subspecific level. If such level is confirmed for the Levantine bats, a new name should be proposed.

FEEDING ECOLOGY. *Rhinolophus euryale* is a medium-sized horseshoe bat hunting in an agile and hovering flight close to vegetation (Gaisler 2001b) and feeding especially on Lepidoptera, Diptera (Tipulidae), Coleoptera (Scarabaeidae) and Neuroptera (Kosejl & Kryštufek 1999, Goiti et al. 2002). For the diet analysis, we collected only one individual containing in its digestive tract Lepidoptera in 100%.

Rhinolophus mehelyi Matschie, 1901

RECORDS. **Original data**: Deir ez Zur: Halabiyyeh [1], ruins of ancient fortress town, 15 April 2001: 1 ind. from *Tyto alba* pellets. – Dimashq: Jeiroud [2], April–June 1908: 4 ma, 1 fa (MNHN specimens identified as *R. euryale* by Trouessart & Kollman 1923). – Halab: Halab [3], 13–23 March 1910: 5 ma, 1 ms, 4 fa, 3 fs (specimens in NMW identified as *R. euryale* by von Wettstein 1913), 4 July 1914: 3 ma, 1 fa, 1 fj (specimens in NMW). – **Published data**: Deir ez Zur: Madan [4], small karst cave ("Staubleichenhöhle"), colony of more than one hundred inds. (Ebenau 1994, 1996, Walter & Ebenau 1997), obs. on 13 March 1994 and 20 March 1996, coll. parasites (Walter & Ebenau 1997). – Raqqa: Cater (= Qatr) Magara cave [5], 1993: 9 inds. (in osteological cave deposit) (Ebenau 1994, 1996); 1994: obs. 1 ind. (Ebenau 1994, 1996); – Raqqa, "Taubenbrunnen" cave [6], 1993: 30 inds. (in osteological cave deposit) (Ebenau 1994, 1996).

DISTRIBUTION. **General**. *Rhinolophus mehelyi* is a species with a Mediterranean type of distribution (Corbet 1978, Horáček et al. 2000, Gaisler 2001c, Csorba et al. 2003). It occurs from the Maghreb and southwestern Europe, over the European Mediterranean (incl. some islands), the Near East to Transcaucasia and western Iran. Unlike the previous species, *R. mehelyi* lives in Cyrenaica (Libya), northern Egypt and in Mesopotamia (Sanborn & Hoogstraal 1955, Hanák & Elgadi 1984, Harrison & Bates 1991).

Near East. *R. mehelyi* is distributed mainly in the Mediterranean habitats of Turkey, Palestine and Iran; it occurs also in Mesopotamia from Turkey to Iraq (DeBlase 1972, Harrison & Bates 1991, Ebenau 1994, 1996, Benda & Horáček 1998, Mendelssohn & Yom-Tov 1999, Karataş & Sachanowicz in press, our data). At the eastern margin of the Near East, *R. mehelyi* reaches the eastern limit of its distribution range. However, this species was overlooked in this area for a long time (DeBlase 1972, cf. Harrison 1964a).

In Turkey, a limited number of records of *R. mehelyi* have been reported throughout the country suggesting areally occurrence (Kahmann & Çağlar 1960, Kahmann 1962, Çağlar 1965, DeBlase 1972, Kock 1974, Felten et al. 1977, von Helversen 1989, Albayrak 1990a, 1993a, Steiner & Gaisler 1994, Hasbenli 1997, Benda & Horáček 1998, Yiğit et al. 2006, Karataş & Sachanowicz in press).

In Iran, this bat has been reported only from the Zagros Mts and the Armenian Highlands in the western part of the country (DeBlase 1972, Sharifi & Hemmati 2001, 2004, Sharifi 2004).

No *R. mehelyi* records are known from Lebanon (Tohmé & Tohmé 1985, Harrison & Bates 1991). In Palestine, the confirmed records of this species are available from Jerusalem, Herzliya and Ramleh (DeBlase 1972, Felten et al. 1977, Makin 1977, Harrison & Bates 1991). Mendelssohn & Yom-Tov (1999) added on their distribution map one record from the northeastern part of Palestine, possibly the Hula Valley, and Ferguson (2002) mentioned a record from Rosh Hanikra. In Jordan, the only specimen was reported from the present-day territory of this country, from the Wadi Araba (Qumsiyeh 1996). *R. mehelyi* was also recorded in the Cairo area and the Nile Delta of Egypt (Qumsiyeh 1985).

In Mesopotamia, the occurrence of *R. mehelyi* has a similar pattern as that of *R. ferrumequinum* (see above). Besides the Syrian distribution (see below), *R. mehelyi* has been known from Iraq. Three records come from the Euphrates Valley and the Syrian Desert; however, two of these records were primarily published by Niazi (1976) as of *R. euryale*. According to the measurements given by Niazi (l.c.), Harrison & Bates (1991) re-identified these records as of *R. mehelyi*; they also added one record of this bat from near Haditha, the Euphrates Valley.

Only one specimen of *R. mehelyi* was reported to come from Cyprus (Felten et al. 1977, cf. Kahmann & Çağlar 1960).

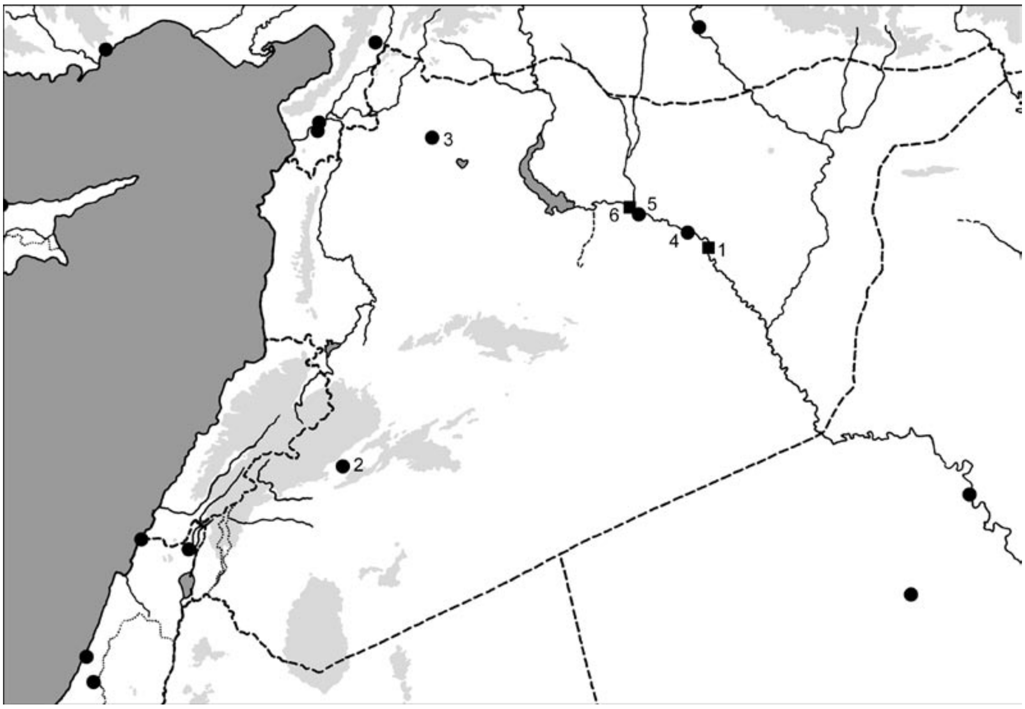


Fig. 47. Records of *Rhinolophus mehelyi* Matschie, 1901 in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

Syria (Fig. 47). *R. mehelyi* is a rather medium-frequent bat in Syria, six confirmed records are available (Table 1). It inhabits two different regions of Syria.

It is distributed along the middle flow of the Syrian Euphrates [1, 4–6], which is a part of the semi-desert region of Syria. The part of *R. mehelyi* distribution range in eastern Syria and southwestern Iraq (Niazi 1976, Harrison & Bates 1991) documents slightly shifted ecological requirements of this species in comparison with the true Mediterranean rhinolophids, i.e. two other medium-sized horseshoe bats (*R. euryale*, *R. blasii*) and *R. hipposideros*. However, *R. mehelyi* has not been found to occur more to the south, in the Syrian and Great Sandy Deserts of central Arabia (Harrison & Bates 1991). In the Euphrates Valley of Syria, nevertheless, *R. mehelyi* as well as *R. ferrumequinum* represent only accesory faunal elements (see also above). However, because of occupancy of this arid area, *R. mehelyi* is the most common Syrian species of medium-sized horseshoe bat, while in other eastern Mediterranean regions it is the rarest one (Kryštufek et al. 1992, Uhrin et al. 1996, Benda & Horáček 1998, Hanák et al. 2001, Benda et al. 2003b).

The other area of *R. mehelyi* occurrence in Syria lies in the western part of the country where it occupies habitats in the transient zone of steppe-maquis (Zohary 1973) between the Mediterranean woodlands and the Syrian Desert [2, 3]. These records are based on the re-examined museum material that was published being incorrectly identified as *R. euryale* (von Wettstein 1913, Trouessart & Kollman 1923).

Most probably, *R. mehelyi* also occurs in the westernmost or Mediterranean woodland part of Syria, however, it has never been found in this region. More intensive research should prove the occurrence of this species in the Mediterranean zone, because both in the southern and northern Levant (Hatay, Palestine) *R. mehelyi* was repeatedly recorded (see above).

Field notes. Most of the material of *Rhinolophus mehelyi* from Syria, for which the finding circumstances are known, comes from bone remnants both from owl pellets and cave deposits. The two exceptions include the finding of an individual roosting in the Qatr Magara (together with *R. ferrumequinum*, *M. capaccinii* and *M. schreibersii*; Fig. 18) and a colony of more than one hundred individuals in a small karstic cave (‘Staubleichenhöhle’) at Madan in the Euphrates Valley, observed on 13 March 1994 and 20 March 1996 (Ebenau 1994, 1996, Walter & Ebenau 1997). The latter roost was probably shared with *M. capaccinii* (see Walter & Ebenau 1997).

In our material, the remains of one individual from *Tyto alba* pellet come from Halabiyyeh (Table 35). Thus, *R. mehelyi* represents 0.05% of bat individuals and <0.01% of mammalian and of total prey items identified in the analysed diet of the barn owl in Syria.

Material examined. 5 ma, 1 ms, 4 fa, 3 fs (NMW 21976 [S], 21977–21988 [S+A]), Aleppo (= Halab), 13–23 March 1910, leg. V. Pietschmann, Mesopotamien-Expedition 1910; – 3 m, 1 f, 1 fj (NMW 21989–21992 [S+A], 21993 [A]), Aleppo (= Halab), 4 July 1914, leg. V. Pietschmann, Armenien-Expedition 1914; – 4 ma, 1 fa (MNHN 1911-580A–E [A]), Djéroud (= Jeiroud), 1908, leg. H. Gadeau de Kerville; – 1 ind. (NMP 90359; rostrum and a pair of mandibles, from owl pellet), Halabiyyeh, 15 April 2001, leg. J. Obuch.

Morphology. See Table 11 and Appendix III for biometric data on the Syrian specimens of *Rhinolophus mehelyi*.

Taxonomy. The geographic variation in *Rhinolophus mehelyi* is relatively poorly known (see e.g. Horáček et al. 2000). Most often, the species is considered monotypic (Ellerman & Morrison-Scott 1951, Felten et al. 1977, Corbet 1978, Strelkov 1981, Qumsiyeh 1985, Kowalski & Rzebik-Kowalska 1991, Steiner & Gaisler 1994, Gaisler 2001c). Alternatively, two subspecies are recognised within its distribution range (Cockrum 1976, Gaisler 1983, Koopman 1994, Csorba et al. 2003, Simmons 2005), viz. *R. m. mehelyi* Matschie, 1901 (terra typica: Bucharest, Romania) and *R. m. tuneti* Deleuil et Labbe, 1955 (t.t.: bat cave NE of El Haouaria, Cap Bon, Tunisia). Anyway, the

Table 11. Basic biometric data on examined Syrian and comparative samples of *Rhinolophus mehelyi* Matschie, 1901, and results of the ANOVA analysis (for details see the text). For abbreviations see pp. 10, 11

	Syria					Southern Balkans					Romania				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	22	**49.44**	48.1	51.1	0.828	20	**50.23**	47.4	52.6	1.577	23	**51.73**	49.8	53.6	0.908
LCr	9	**19.85**	19.40	20.27	0.239	23	**20.12**	19.66	20.58	0.254	21	**20.27**	19.77	20.64	0.225
LCc	16	**17.08**	16.72	17.37	0.170	29	**17.18**	16.71	17.56	0.247	23	**17.34**	16.93	17.54	0.147
LaZ	17	**10.39**	10.07	10.67	0.154	30	**10.38**	10.07	10.72	0.153	23	**10.46**	9.98	10.89	0.203
LaI	17	**2.44**	2.20	2.62	0.111	30	**2.52**	2.19	2.91	0.168	23	**2.50**	2.21	2.68	0.127
LaN	17	**8.51**	8.18	8.82	0.189	30	**8.79**	8.44	9.08	0.181	23	**8.87**	8.57	9.34	0.176
ANc	0	–	–	–	–	30	**6.24**	5.93	6.61	0.153	23	**6.18**	5.94	6.48	0.131
CC	0	–	–	–	–	27	**5.00**	4.66	5.28	0.155	22	**5.08**	4.82	5.28	0.125
M^3M^3	0	–	–	–	–	30	**7.24**	7.03	7.44	0.121	23	**7.29**	6.96	7.45	0.104
CM^3	17	**6.81**	6.62	6.95	0.108	29	**6.76**	6.50	7.02	0.129	23	**6.78**	6.59	7.02	0.113
LMd	17	**12.56**	12.25	12.83	0.169	30	**12.65**	12.20	13.07	0.216	23	**12.69**	12.42	13.03	0.159
ACo	0	–	–	–	–	30	**2.91**	2.73	3.12	0.107	23	**2.93**	2.74	3.11	0.101
CM_3	17	**7.27**	7.07	7.50	0.114	29	**7.18**	6.84	7.39	0.145	23	**7.19**	7.02	7.38	0.104
PR	17	**0.528**	0.471	0.678	0.054	30	**0.520**	0.411	0.602	0.049	23	**0.518**	0.384	0.606	0.055

	Maghreb					Cyrenaica (Libya)					ANOVA	
	n	**M**	min	max	SD	n	**M**	min	max	SD	F	p
LAt	21	**50.03**	48.2	52.5	1.116	20	**47.13**	46.0	48.2	0.707	69.28	***
LCr	40	**20.13**	19.54	20.82	0.299	20	**19.79**	19.36	20.23	0.256	38.85	***
LCc	40	**17.31**	16.78	17.84	0.215	20	**16.95**	16.53	17.33	0.248	40.48	***
LaZ	42	**10.58**	9.62	11.06	0.250	20	**10.34**	10.07	10.68	0.149	13.00	***
LaI	42	**2.57**	2.14	2.77	0.122	20	**2.58**	2.47	2.87	0.087	1.52	
LaN	42	**8.73**	8.30	9.08	0.190	20	**8.60**	8.42	8.85	0.117	41.10	***
ANc	40	**6.31**	5.95	6.60	0.174	20	**6.14**	5.71	6.35	0.181	9.87	***
CC	42	**5.21**	4.76	5.42	0.122	20	**5.15**	4.84	5.39	0.137	0.33	
M^3M^3	42	**7.43**	6.65	7.68	0.163	20	**7.31**	7.07	7.62	0.140	1.29	
CM^3	42	**6.88**	6.74	7.12	0.105	20	**6.79**	6.62	7.03	0.100	1.04	
LMd	42	**12.86**	12.24	13.42	0.237	20	**12.51**	12.09	12.81	0.219	27.58	***
ACo	42	**3.06**	2.69	3.35	0.148	20	**2.95**	2.74	3.17	0.109	0.95	
CM_3	42	**7.34**	7.11	7.63	0.117	20	**7.22**	6.93	7.58	0.144	0.23	
PR	42	**0.506**	0.371	0.858	0.074	19	**0.523**	0.397	0.629	0.067	4.55	*

populations inhabiting the Middle East and Egypt are considered to be a part of the nominotypical subspecies (Harrison & Bates 1991, Koopman 1994, Csorba et al. 2003), and the form *tuneti* is assigned to the Maghrebian populations.

The comparison of cranial dimensions of several populations of *R. mehelyi* (Table 11, Fig. 48) showed two basic groups of individuals differing in size, whose dimensional ranges, however, mostly overlap. The larger bats come from southern Europe and the Maghreb, while a bit smaller representatives pertain to populations of the Levant and Cyrenaica (Libya). Significant size differences were found between the Euro-Maghrebian and the Levantine-Libyan samples (ANOVA; Table 11), suggesting separate taxonomic positions for these populations. Similar relations were found also by Qumsiyeh & Schlitter (1982), who pointed out: “[*R. mehelyi*] from eastern Libya and Egypt are small in many cranial and external measurements when compared to those of the Eastern Mediterranean region and northwestern Africa (Algeria, Morocco, Tunisia). This difference may help explain why various authors have identified some Egyptian material as *R. euryale*”. Qumsiyeh (1985), who probably compared a smaller number of museum specimens of

R. mehelyi than we did in the present analysis, found a similar size difference, but he concluded: "I could find no distinctions between European specimens and specimens I examined from North Africa and tend to consider all those as belonging to the nominate subspecies. There is a trend towards a decrease in body size around the Mediterranean from north to south and west to east; the smallest specimens come from Egypt." However, according to our comparison, the European and Maghrebian populations are of a rather similar size, while those of the Near East and Cyrenaica smaller than the former. The geographic variation in *R. mehelyi* shows a similar pattern as in *R. euryale*, where the Levantine samples also include the smallest representatives.

The only synonym available for designation of the possible Levantine and NE-African populations of *R. mehelyi* is the name *Euryalus judaicus* Andersen et Matschie, 1904, for a long time regarded to be a synonym of *R. euryale* (for details see Taxonomy under the latter species). As a conclusion, we consider the Syrian (as well as the other Levantine, Cyrenaican and Egyptian) populations of *R. mehelyi* to belong to the subspecies *R. m. judaicus*, described from the Adullam Cave (= Mogharet Khureitun Cave) near Jerusalem, Palestine (Andersen & Matschie 1904). Besides, records of *R. mehelyi* from the Levant, Egypt or Iraq were assigned to the form *judaicus* (although under a different species concept) distinct from the European *euryale* and/or *mehelyi* already by Andersen (1905a, b), von Wettstein (1913), Bodenheimer (1935, 1958), Allen (1939), Ellerman & Morrison-Scott (1951), Lewis & Harrison (1962), Harrison (1956c, 1964a), and Niazi (1976). On the other hand, the comparison of the Maghrebian and European samples did not show noteworthy size differences and thus, we suggest the name *R. e. tuneti* to be considered a junior synonym of *R. mehelyi* (see also Kahmann 1958b).

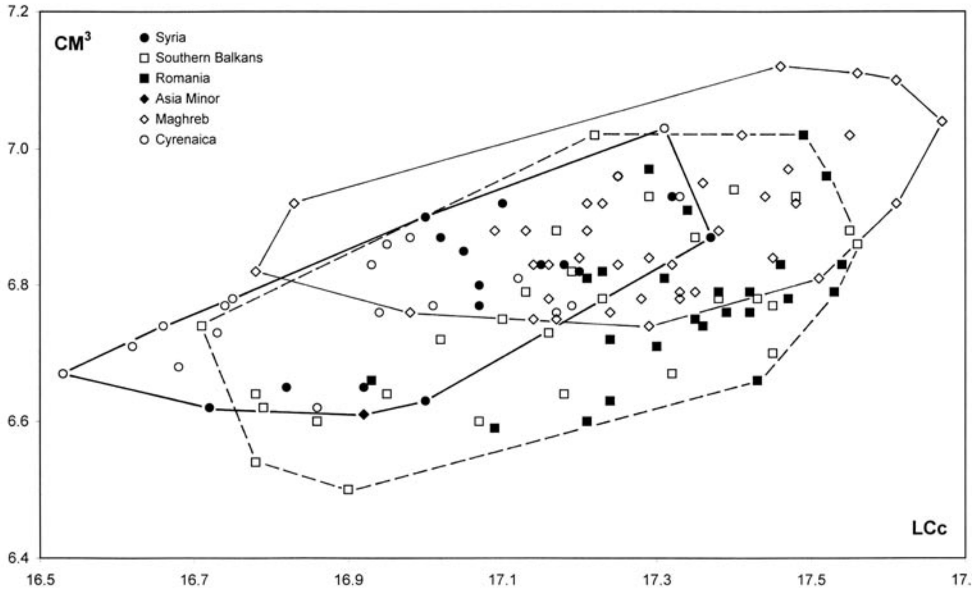


Fig. 48. Bivariate plot of examined Syrian and comparative samples of *Rhinolophus mehelyi* Matschie, 1901: condylocanine length of skull (LCc) against the length of upper tooth-row (CM^3). Explanation: bold-lined polygon = samples of the Middle East and Cyrenaica (n=37), tentatively assigned to *R. m. judaicus*; dashed polygon = Balkan samples (n=52), i.e. *R. m. mehelyi*; thin-lined polygon = Maghrebian samples (n=40).

Parasites. Diptera: Streblidae: *Brachytarsina flavipennis* Macquart, 1851: Staubleichenhöhle, mittleres Euphrattal (Walter & Ebenau 1997).

Rhinolophus blasii Peters, 1866

Records. **Original data**: Al Lathiqiyeh: Al Lathiqiyeh [1], 2 fa (specimens in MNHN). – Dimashq: Jeiroud [2], April–June 1908: 6 inds. (MNHN specimens identified as *R. euryale* by Trouessart & Kollman 1923). – **Published data**: Halab: Aleppo (= Halab) [3], 13–23 March 1910: 5 ma, 6 ms, 2 fa, 1 fs (von Wettstein 1913; but modified according to the examination of NMW specimens, see Material examined – von Wettstein 1913 gave 'April 1910: 12 m, 2 f').

Possible records (Syria *sensu lato*). **Original data**: Syria, 2 inds. (specimens in MNHN and ZFMK). – **Published data**: Syrien (as *R. clivosus*) (Fitzinger 1870a). – Syrien, 2 inds., Dr. Rey (Nehring 1886). – Syria, 1 ad. ind. (Andersen 1906).

Distribution. **General**. *Rhinolophus blasii* is a species with a combined Mediterranean and Afro-tropical type of distribution (Corbet 1978, Koopman 1994, Horáček et al. 2000, Kryštufek & Đulić 2001, Csorba et al. 2003). In the Palaearctic, it occurs in the Maghreb and from southeastern Europe and the Balkans (incl. east-Mediterranean islands), over Transcaucasia and the Middle East, to southwestern Turkmenistan, Afghanistan and Pakistan. The Afro-tropical part of distribution comprises southwestern Arabia and the savanna belt of East and South Africa, from Eritrea to Natal (Kock & Howel 1988, Al-Jumaily 1998).

Near East. *R. blasii* occurs in the Mediterranean parts of the Near East (DeBlase 1980, Harrison & Bates 1991, Benda & Horáček 1998); it has been recorded in Turkey, Iran and the Levant.

In Turkey, *R. blasii* was recorded only in coastal areas of the western and southern regions (Kahmann & Çağlar 1960, Çağlar 1965, Corbet & Morris 1967, Kock 1974, Felten et al. 1977, von Helversen 1989, Albayrak 1993a, Benda & Horáček 1998, Yiğit et al. 2006), however, in the eastern part of the country the occurrence of this species is well presumable (Benda & Horáček 1998). In western Iran, *R. blasii* has been recorded in the Zagros Mts and the Armenian Highlands, i.e. the mountainous areas only (Felten et al. 1977, DeBlase 1980, our unpubl. data), although this bat occurs throughout the eastern part of the country, including desert regions (see Etemad 1964, Lay 1967, DeBlase 1980, de Roguin 1988).

In the Levant, *R. blasii* is known to inhabit Hatay (Kahmann & Çağlar 1960), Syria (von Wettstein 1913, our data), Palestine and Jordan (Harrison & Bates 1991, Qumsiyeh 1996); no reports exist from Lebanon (Tohmé & Tohmé 1985, Harrison & Bates 1991). In Palestine, this species occurs in the Mediterranean zone (Tristram 1866, 1884, Bodenheimer 1935, 1958, Dor 1947, Theodor & Moscona 1954, Harrison 1964a, Theodor 1967, Felten et al. 1977, Makin 1977), including several records in the Galilee and surroundings of Lake Tiberias (Mendelssohn & Yom-Tov 1999). *R. blasii* records in Jordan come both from the northwestern Mediterranean part of the country as well as from dry southwestern regions adjacent to the deserts of Wadi Araba (Qumsiyeh 1980, 1996, Qumsiyeh et al. 1986, 1992).

A relatively high number of *R. blasii* records has been reported from Cyprus (Fitzinger 1870a, Bate 1903, Sanborn & Hoogstraal 1953, Lanza 1959b, Felten et al. 1977, Spitzenberger 1979, Boye et al. 1990, our unpubl. data).

Syria (Fig. 49). *R. blasii* is a rare bat in Syria, only three confirmed records are available (Table 1). They come only from the western part of the country, i.e. the Mediterranean coast [1] and the intermediate zone of the Mediterranean steppe-maquis [2, 3]. No records are known from the rather arid central and eastern regions of Syria. Syrian records of *R. blasii* well connect the known distribution in the Levant; Cilicia and Hatay in the north (Benda & Horáček 1998) and in Palestine and Jordan in the south (Mendelssohn & Yom-Tov 1999, Qumsiyeh et al. 1998).

The first record of *R. blasii* in Syria in its broader sense was probably published by Fitzinger (1870a), but under species affiliation to *R. clivosus* Cretzschmar, 1828. In that time, *R. blasii* was often confused with *R. clivosus*, or both forms were considered to be one species, see e.g. von Keyserling & Blasius (1839) and Kolenati (1856b). Both the latter authors mentioned European *R. clivosus* (s. l.) from 'Levante', therefore they might regard *R. blasii* or *R. clivosus* in the present-day understanding (and both species occur in the Levant or Syria *s.l.*, but not in Syria *s.s.*). A similar confusion is possible also in the case of the Fitzinger's (1870a) record. Although the subsequent reports by Nehring (1886) and Andersen (1906) mentioned *R. blasii* without any doubts, their geographical categorisation is unclear according to the modern view.

The first accurate record attributed to *R. blasii* was published by von Wettstein (1913) from Aleppo (= Halab). These specimens (11 males and three females), that collected by V. Pietschmann during his Mesopotamien-Expedition in 1910, are deposited in NMW under numbers 21962–21975 (specimens in alcohol, skulls extracted). Indeed, all these individuals represent *R. blasii* according to their skull measurements and noseleaf morphology (see Identification under *R. euryale*). Several older specimens we found in the collections of MNHN (1860-487A–C, E–G; 1921-86) and of ZFMK (79.627). The MNHN bats were labelled '*R. euryale*, Syrie', while ZFMK specimen '*R. clivosus*, Syrien'. All these bats of only approximate origin were found to be *R. blasii* (the series 1860-487 consist of 7 bats; 6 *R. blasii*, 1 *R. euryale*, see also above). In MNHN, two more specimens (1876-339, 894) were found labelled '*R. euryale*, Lattakié' and they were also identified as *R. blasii*.

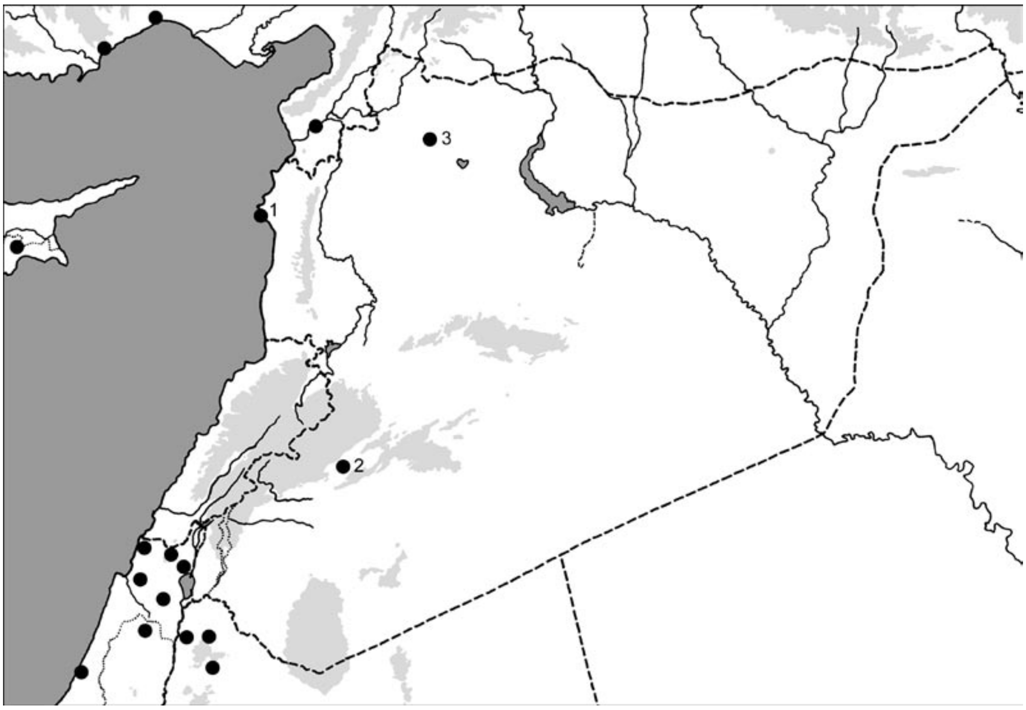


Fig. 49. Records of *Rhinolophus blasii* Peters, 1866 in Syria and surrounding areas.

MATERIAL EXAMINED. 5 ma, 6 ms, 2 fa, 1 fs (NMW 21962–21975 [S+A]), Aleppo (= Halab), 13–23 March 1910, leg. V. Pietschmann, Mesopotamien-Expedition 1910; – 2 fa (MNHN 1876-339, 1985-894 [S+A]), Lattakié (= Al Lathiqiyeh), leg. M. Deyrolles & H. Gadeau de Kerville; – 6 inds. (MNHN 1860-487A–C, E–G [B, skulls inside]), Syrie, 1860, leg. Blanche; – 1 ind. (MNHN 1921-86 [S+A]), Syrie, leg. D. Siépi; – 1 ma (ZFMK 79.627 [S+A]), Syrien, 1894, ded. Schlüter, Halle.

MORPHOLOGY. See Tables 12, 13 and Appendix III for biometric data on the Syrian specimens of *Rhinolophus blasii*.

TAXONOMY. *Rhinolophus blasii* is a polytypic species, which creates at least four subspecies within its distribution range (Hayman & Hill 1971, Kock & Howel 1988, Koopman 1994, Csorba et al. 2003, Simmons 2005); viz. *R. b. blasii* Peters, 1866 (terra typica: 'Oberitalien, in Turin, Mailand und am Gardasee, in Mittelitalien, Sicilien, Istrien und Dalmatien' given by Blasius 1857*); *R. b. empusa* Andersen, 1904 (t.t.: Zomba, Nyasaland [= Malawi]); *R. b. andreinii* Senna, 1905 (t.t.: Adi Ugri, Eritrea); and *R. b. meyeroehmi* Felten, 1977 (t.t.: Pashtunkot, Fariab, Afghanistan).

The Palaearctic populations of *R. blasii*, including those of the Maghreb, southeastern Europe and the Middle East and Afghanistan, were primarily considered to belong to one form, the nominotypical subspecies (Andersen 1905b, Ellerman & Morrison-Scott 1951, Aellen 1959, Aellen & Strinati 1970, Gaisler 1971, Hayman & Hill 1971, Corbet 1978, Strelkov et al. 1978, DeBlase 1980, Strelkov 1981). Felten et al. (1977) evaluated the material of 50 individuals of *R. blasii* from its whole Palaearctic range and divided it into two forms; *R. b. blasii* occurring in the Mediterranean region eastwards to western Turkey, and a newly described *R. b. meyeroehmi* from Afghanistan and Iran. This opinion was well accepted by most of later authors (Corbet 1984, Corbet & Hill 1992, Koopman 1994, Horáček et al. 2000, Kryštufek & Đulić 2001, Kock et al. 2002, Csorba et al. 2003, etc.).

However, Kock & Howel (1988) indicated Persian populations to belong to the nominotypical subspecies, both in their text and map, but without any explanation why they refused the results by Felten et al. (1977), although they accepted ssp. *meyeroehmi* in Afghanistan. *R. b. blasii* from Iran was reported also by de Roguin (1988). This statement was commented by Kryštufek & Đulić (2001) who pointed out the uncertain status of Iran populations which could belong to *R. b. blasii* or *R. b. meyeroehmi*. On the other hand, Csorba et al. (2003) reported *R. b. meyeroehmi* to occur in Iran, Turkmenistan, Afghanistan, and Pakistan.

The taxonomic status of northern Arabian populations of *R. blasii* has not yet been evaluated, although a larger number of authors mentioned only the nominotypical form from various regions of the Near East (Harrison 1956c, 1964a, Hayman & Hill 1971, Atallah 1977, Spitzenberger 1979, Qumsiyeh 1980, Kock & Howel 1988, Harrison & Bates 1991, Mendelssohn & Yom-Tov

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* NOTE. For his new species *R. clivosus* (preoccupied by *R. clivosus* Cretzschmar, 1828), Blasius (1857: 34) specified the distribution in 'Oberitalien, in Turin, Mailand und am Gardasee, in Mittelitalien, Sicilien, Istrien und Dalmatien' which designates the terrae typicae of the species (ICZN 1999: Article 76.1.). However, *R. blasii* Peters, 1866 (= nomen novum for *R. clivosus* Blasius, 1857) has recently been unknown in most of these areas (see e.g. Mitchell-Jones et al. 1999, Horáček et al. 2000, Kryštufek & Đulić 2001, etc.). Probably for this reason, Miller (1912) unjustifiedly changed the terra typica to 'Southeastern Europe'. On the other hand, Kryštufek & Đulić (2001) suggested to restrict t.t. to 'Trieste oder seiner Umgebung' and Csorba et al. (2003) mentioned 'Italy' as terra typica. However, there exist at least two type specimens of *R. clivosus* Blasius, 1857, both coming from the Blasius' collection. One specimen, labelled 'Mailand' [= Milan, Italy], is deposited in the State Museum of Natural History in Braunschweig, Germany (Hevers 2005). Turni & Kock (in press) mentioned another specimen coming from Triest [= Istria *s.l.*, Italy/Slovenia/Croatia], located in the Natural History Museum in Berlin (ZMB). Turni & Kock (in press) indicated the latter specimen to be a holotype but it probably represents a lectotype specimen, since Blasius (1857) did not designate any type material. In accordance with the origin of the type material presently being, we suggest to restrict the terra typica of *R. blasii* to 'Milan and Triest', which well concords with the Blasius' broad definition (although in the both areas the species seems to be presently extinct, see Kryštufek & Đulić 2001).

Table 12. Basic biometric data on examined Syrian and comparative samples of *Rhinolophus blasii* Peters, 1866. For abbreviations see pp. 10, 11

	Syria					W Middle East					E Middle East				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	24	**46.93**	43.6	49.1	1.334	26	**47.02**	44.7	49.0	1.061	27	**47.29**	44.5	50.0	1.198
LCr	14	**19.55**	18.30	20.10	0.485	26	**19.62**	19.07	20.42	0.292	23	**19.48**	18.83	20.02	0.294
LCc	17	**16.79**	16.13	17.18	0.308	26	**16.80**	16.27	17.76	0.295	27	**16.81**	16.32	17.37	0.321
LaZ	18	**9.24**	8.98	9.55	0.125	26	**9.14**	8.81	9.42	0.145	29	**9.13**	8.67	9.53	0.272
LaI	18	**2.32**	2.12	2.47	0.086	26	**2.32**	2.08	2.55	0.130	29	**2.34**	2.14	2.52	0.098
LaN	18	**8.27**	8.02	8.60	0.144	26	**8.39**	8.02	8.65	0.137	29	**8.23**	7.69	8.68	0.268
ANc	17	**6.09**	5.82	6.35	0.152	26	**6.12**	5.76	6.34	0.154	27	**6.06**	5.77	6.33	0.140
CC	17	**4.53**	4.12	4.68	0.133	26	**4.42**	4.17	4.63	0.093	29	**4.42**	4.07	4.64	0.137
M^3M^3	18	**6.52**	6.32	6.70	0.123	26	**6.43**	6.26	6.69	0.115	29	**6.61**	6.47	6.82	0.090
CM^3	18	**6.80**	6.58	7.00	0.124	26	**6.72**	6.50	6.94	0.105	29	**6.75**	6.55	6.93	0.096
LMd	18	**11.37**	1.20	12.25	2.547	26	**11.96**	11.57	12.34	0.208	29	**12.07**	11.74	12.48	0.211
ACo	18	**2.67**	2.44	2.85	0.096	26	**2.65**	2.48	2.78	0.077	29	**2.61**	2.32	2.86	0.140
CM_3	18	**7.15**	6.95	7.40	0.122	26	**6.99**	6.69	7.24	0.128	29	**7.10**	6.87	7.32	0.108
PR	17	**0.934**	0.775	1.046	0.077	23	**0.908**	0.753	1.019	0.075	29	**0.884**	0.755	1.058	0.068

	SE Europe					Maghreb					Yemen				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	26	**46.78**	43.9	49.0	1.084	36	**46.77**	43.4	49.0	1.280	4	**47.05**	46.7	47.8	0.507
LCr	23	**19.73**	18.95	20.23	0.338	37	**19.66**	19.29	20.17	0.213	4	**19.72**	19.48	20.07	0.250
LCc	32	**16.85**	16.30	17.23	0.253	52	**16.78**	16.40	17.17	0.189	4	**16.61**	16.38	16.91	0.223
LaZ	30	**9.17**	8.92	9.47	0.135	52	**9.39**	9.12	9.88	0.150	4	**9.07**	8.97	9.18	0.087
LaI	32	**2.39**	2.07	2.62	0.138	52	**2.36**	2.18	2.60	0.082	4	**2.35**	2.25	2.39	0.065
LaN	32	**8.38**	7.92	8.75	0.218	52	**8.40**	8.02	8.68	0.152	4	**8.33**	8.21	8.43	0.099
ANc	32	**6.09**	5.77	6.38	0.185	52	**6.11**	5.82	6.53	0.146	4	**6.10**	6.02	6.15	0.056
CC	31	**4.43**	3.89	4.68	0.168	50	**4.57**	4.32	4.87	0.111	4	**4.33**	4.29	4.37	0.033
M^3M^3	31	**6.46**	6.21	6.73	0.119	52	**6.54**	6.16	6.86	0.136	4	**6.31**	6.27	6.36	0.040
CM^3	32	**6.69**	6.42	6.92	0.104	52	**6.70**	6.40	6.93	0.103	4	**6.63**	6.61	6.66	0.024
LMd	32	**11.95**	11.52	12.22	0.195	52	**12.09**	11.67	12.42	0.162	4	**11.86**	11.71	12.06	0.158
ACo	32	**2.71**	2.40	3.02	0.132	52	**2.70**	2.50	2.97	0.091	4	**2.51**	2.41	2.62	0.108
CM_3	32	**7.01**	6.85	7.22	0.114	52	**7.12**	6.93	7.40	0.096	4	**6.99**	6.95	7.02	0.038
PR	32	**0.927**	0.803	1.048	0.058	52	**0.877**	0.767	0.993	0.052	4	**0.88**	0.80	0.96	0.063

1999). South Arabian populations known from Yemen were assigned to *R. b. blasii* by Kock et al. (2002).

According to the above mentioned views, one of two forms is likely to occur in Syria; either *R. b. blasii* similarly as in western Turkey, Cyprus and other parts of the Mediterranean, or *R. b. meyeroehmi*, provided that this subspecies occurs also in Iran (and eastern Turkey). Felten (in Felten et al. 1977) described ssp. *meyeroehmi* being somewhat larger in skull and forearm dimensions than the nominotypical form, but moreover, differing by much longer proximal and medial phalangi of their fourth wing fingers (see Table 13). Our Syrian samples as well as the examined bats from Iran and Afghanistan agree in the forearm length and in skull measurements with all compared samples from the Mediterranean (in total, 170 specimens were examined, Table 12). These results suggest that the skull and forearm sizes do not affect significantly the geographic variation of the Palaearctic populations of *R. blasii*. Unfortunately, we did not compare the length of the fourth finger phalangi in the whole set of examined samples of *R. blasii*, however, the studied populations showed almost consistent relations in these characters (Table 13). Our

Table 13. Comparison of wing phalangi lengths in several population samples of *Rhinolophus blasii* Peters, 1866. For abbreviations see pp. 10, 11

			our data					Felten et al. 1977	
	n	**M**	min	max	SD	n	**M**	min	max
			Syria					Mediterranean	
IV.D1	24	**8.48**	7.8	9.2	0.350	35	**8.55**	7.6	9.6
IV.D2	23	**14.83**	13.9	16.2	0.628	35	**15.40**	14.4	16.6
			Western Turkey					Afghanistan & Iran	
IV.D1	8	**8.43**	8.1	8.8	0.255	15	**9.50**	9.0	10.2
IV.D2	8	**15.18**	13.8	15.9	0.645	15	**16.95**	15.9	17.8
			Western Iran						
IV.D1	13	**8.87**	8.3	9.3	0.340				
IV.D2	13	**15.12**	14.0	16.2	0.619				
			Southeastern Europe						
IV.D1	23	**8.53**	7.9	9.3	0.325				
IV.D2	23	**14.50**	13.6	15.6	0.491				
			Maghreb						
IV.D1	36	**8.61**	7.9	9.8	0.399				
IV.D2	36	**14.83**	14.0	15.9	0.435				

results clearly show that the nominotypical subspecies as defined by Felten et al. (1977) lives in the whole Mediterranean region from Maghreb and southeastern part of Europe to Syria and also to western (Mediterranean) Iran. The form *R. b. meyeroehmi* probably occurs in eastern Iran only (but see de Roguin 1988) and in Afghanistan. The preliminary suggestion by Harrison (1964a), Kock & Howel (1988) and Harrison & Bates (1991) of the occurrence of *R. b. blasii* in the whole Arabian species range (with an exception of the Omani populations, see Harrison & Bates 1991) seems to be well confirmed (cf. Kock et al. 2002).

Hanák (1964) and Popov & Ivanova (2002) evaluated certain Balkan samples of *R. blasii* along with published morphometric data. They suggested an exclusive position of several Balkan populations of this bat among the Palaearctic populations due to their larger body size. However, our large-scale data set (see Appendix II), approached in a comparative way and without inclusion of any published data, did not confirm these results; the metrical characteristics of southeastern European samples are in concordance with other Mediterranean material (Table 12). The different results by Hanák (1964) and/or Popov & Ivanova (2002) were perhaps caused by different definitions of the particular dimensions compared.

Asellia tridens (Geoffroy, 1813)

Records. **Original data**: Deir ez Zur: As Salihiyyah [1], ruins of ancient Dura Europos, 18–19 June 1998: 5 inds. from *Tyto alba* pellets; 19 April 2001: 6 inds. from *Tyto alba* pellets; – As Salihiyyah [2], valley ca. 2 km NW of Dura Europos, 19 April 2001: 1 ind. from *Tyto alba* pellet; – Halabiyyeh [3], ruins of ancient fortress town, 1 June 1989: 29 f, 1 m; 17 June 1998: through all ruins obs. dispersed colony of ca. 200 inds. (coll. 7 faG, 2 fa); 17 June 1998: 3 inds. from *Tyto alba* pellets; 15 April 2001: 17 inds. from *Tyto alba* pellets; – Qala'at ar Rahba [4], castle ruins, 17 May 2001: coll. 1 ma; – Zalabiyyeh [5], rocks under ancient ruins, 15 April 2001: 3 inds. from *Tyto alba* pellets. – Homs: Tadmor [6], ancient ruins, 30 April 1995: 1 fa roadkill; 5 October 1995: 1 fa roadkill; Tadmor, Afqa cave, 20 September 1988: 13 m, 1 ind.; 17 May 1989: 16 m, 2 f; 22 February 1996: obs. colony min. 50 inds., coll. 1 m; 23 June 1998: obs. colony of ca. 100 inds. (coll. 11 m); 21 May 2001: obs. colony of 800–1000 inds.; 6 October 2004: obs. colony of ca. 500–800 inds., exam. 22 ma; Tadmor, palmeria, 23 June 1998: 1 ind. from *Asio otus* pellet; 23 April 2001: 5 inds. from *Asio otus* pellets;

15 September 2005: 7 inds. from *Asio otus* pellets; – Tadmor, rocks 5 km W of ruins [7], 23 June 1998: 1 ind. from *Bubo bubo* pellet; 24 April 2001: 2 inds. from *Bubo bubo* pellets. – **Published data**: Deir ez Zur: Halabiye (= Halabiyyeh) [3], 15–17 August 1978: 1 fs (Nader & Kock 1983c). – Homs: Palmyra (= Tadmor) [6], ruins of ancient town, 23 April 1965: 1 m, 2 f (Atallah & Harrison 1967); Tadmur, Hammam (Afqa spring) (= Tadmor, Afqa cave), 11 March 1979: 1 ma (Nader & Kock 1983c); Palmyra, 'Sole-Stollen' (= Tadmor, Afqa cave), 1993: colony of ca. 200 inds. (Ebenau 1994, 1996). – Raqqa: Cater (= Qatr) Magara cave [8], 1993: 5 inds. in osteological cave deposit (Ebenau 1994, 1996); – Raqqa, 'Taubenbrunnen' cave [9], 1993: 2 inds. in osteological cave deposit (Ebenau 1994, 1996). – Quneitra / Golan Heights: Mount Hermon [10], a record mapped (Mendelssohn & Yom-Tov 1999).

DISTRIBUTION. **General**. *Asellia tridens* is a Saharo-Sindian species which inhabits arid areas of North Africa and the Middle East, it also marginally reaches the west of the Oriental region (Owen & Qumsiyeh 1987, Koopman 1994, Bates & Harrison 1997, Horáček et al. 2000). The African range includes parts of the Sahara and Sahel, from Senegal and Morocco to Sudan and Egypt, also in Ethiopia, Somalia and Socotra (Kock 1969, Hayman & Hill 1971). In the Middle East it occurs in whole Arabia including Palestine, and from central Syria, over Iraq and southern Iran to southern Afghanistan and western Pakistan (DeBlase 1980, Harrison & Bates 1991, Bates & Harrison 1997).

Near East. *A. tridens* occurs in two areas of the Near East; along the Rift Valley area of Palestine, Egypt, Jordan and southwestern Syria, and in Mesopotamia from central Syria to southwestern Iran. However, these main areas are not distinctly separated, unlike in *T. nudivetris* which has generally a very similar pattern of distribution. No records of *A. tridens* in Turkey and Lebanon are available, although its occurrence there is presumable (Benda & Horáček 1998, Karataş & Sachanowicz in press). In the Near East as well as in the Maghreb, *A. tridens* reaches northern margins of its distribution range.

In Palestine, *A. tridens* occurs mainly along the Rift, from the Hula to Arava Valleys (Tristram 1884, Bodenheimer 1935, Harrison 1964a, Qumsiyeh 1985, 1996, Makin 1977, 1987, Owen & Qumsiyeh 1987, 1989, Yom-Tov et al. 1992a, Mendelssohn & Yom-Tov 1999); some records, however, come also from the Judean Hills and Coastal Plains (Theodor & Moscona 1954, Bodenheimer 1958, Harrison 1964a, Qumsiyeh 1985, Owen & Qumsiyeh 1987, Makin 1989, Mendelssohn & Yom-Tov 1999, Ferguson 2002) and from the Negev Desert (Korine & Pinshow 2004). The only two records of this bat in Jordan come from An Naqah and Petra, both close to the Wadi Araba (Qumsiyeh 1996, Disi & Hatough-Bouran 1999). *A. tridens* has been reported also from Sinai (Anderson 1902, Hoogstraal 1962).

In Mesopotamia, most records of *A. tridens* were made in Iraq. Although majority of Iraqi records comes from Baghdad and its surroundings (Cheesman 1920, Sanborn 1940, Tate 1941a, Hubbard 1955, 1956, Hopkins & Rothschild 1956, Hatt 1959, Nadachowski et al. 1990), *A. tridens* occurs along the Euphrates from the Syrian border to central Iraq (Cheesman 1920, Weber 1955, Harrison 1956b, 1959, Al-Robaae 1966, Nader 1969, Shamsuddin & Mohammad 1978, Khajuria 1988, Abul-Hab & Shihab 1989, Nadachowski et al. 1990) and along the Tigris down from Mosul (von Wettstein 1913, Al-Robaae 1966). In Persian Mesopotamia, *A. tridens* lives in the middle part of the Karun Valley and along the Kabir Range (Etemad 1967, Lay 1967, DeBlase 1980, our unpubl. data).

Syria (Fig. 50). *A. tridens* is a medium-frequent bat in Syria, ten records are known from its territory (Table 1). It inhabits two different areas. Most records come from desert habitats along the Euphrates, between Raqqa and As Salihiyyah [1–5, 8, 9] (Nader & Kock 1983c, Ebenau 1994, 1996, our data), and from an oasis in the Syrian Desert (Tadmor) [6, 7] (Atallah & Harrison 1967, Nader & Kock 1983c, Ebenau 1994, 1996, our data). This area of distribution connects the Mesopotamian range in Iraq, where the closest records are known from El Gaim (= Al Qa'im) (Weber 1955) and from around Haditha (Khajuria 1988, Abul-Hab & Shihab 1989). The occurrence of

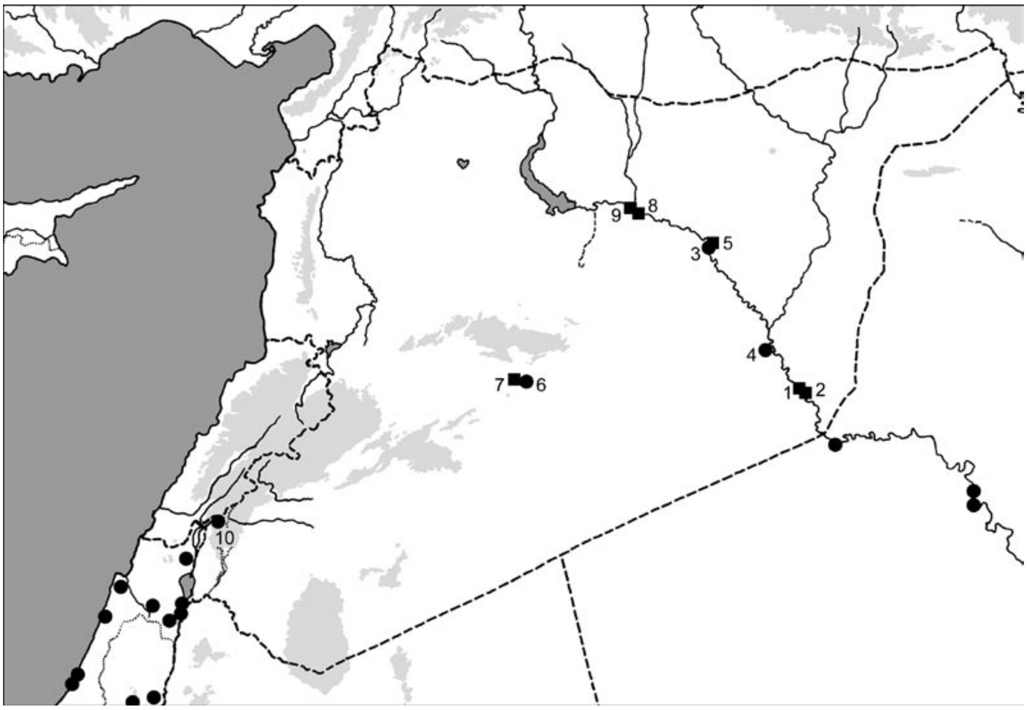

Fig. 50. Records of *Asellia tridens* (Geoffroy, 1813) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

A. tridens in the oasis of Tadmor, on the other hand, connects the Euphrates range with the other region of Syrian distribution of this bat, the Rift Valley and nearby areas.

In the Syrian part of the Rift Valley, *A. tridens* was found at Mount Hermon [10] (Mendelssohn & Yom-Tov 1999). In the Rift Valley as well as in entire northern Palestine, it is a common bat (Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999). Thus, *A. tridens* should be found also in arid areas adjacent to the Rift in southwestern Syria (and also in Jordan and Lebanon) which provide sufficient rocky shelters, e.g. the Golan Heights or the Al Yarmuk Valley.

FIELD NOTES. Most records of *Asellia tridens* from Syria come from Tadmor (Fig. 51). The Afqa Cave of Tadmor, a complex of sulphuric mines (two to approximately four metres high corridors), combined with natural caverns and a spring, with a total length of several hundreds of metres, formerly used as public baths, serves a roost to a huge colony of this species (Fig. 52). The first known records come from 23 April 1965 and 11 March 1979 (Atallah & Harrison 1967, Nader & Kock 1983c). On 20 September 1988, 13 males were collected there (plus an individual of undetermined sex) and on 17 May 1989, 16 males and two females. A colony of ca. 200 individuals was observed there in 1993 (Ebenau 1994, 1996), while on 22 February 1996 some 50 individuals only. During a visit on 22 June 1998, a colony of ca. 250–300 individuals dispersed in the whole system (including lightened buildings connected with the complex above ground) was observed. Three years later, on 21 May 2001, at least 800 individuals were counted in the cave. Another three years later, but during an autumn visit, on 6 October 2004, a colony of ca. 500–800 individuals was counted in the whole system. In all observations, only males were found among examined bats from the Afqa Cave, with an exception of the visit in 1989, which suggests existence of another colony – a nursery one – in a different place in this oasis. Such finding conforms with the situation described by Al-Robaae (1966) who found sexually separated colonies in Iraq, but in the spring period only. Bats foraging in large density along street lamps (regularly observed during our visits in the oasis) probably often become victims of collisions with cars, as shown by two findings of roadkills in the area of ancient ruins close to the built-up part of the oasis in 1995.

The colony of *A. tridens* in Halabiyyeh was also repeatedly observed. Perhaps it was first found on 15–17 August 1978 (Nader & Kock 1983c), although there is no direct evidence of existence of a colony, since only a subadult female was collected. However, the colony was observed on 1 June 1989, when 29 females were collected. On 17 June 1998, in this ruined fortress city (Fig. 16), a colony of ca. 200 individuals was observed to be dispersed among several places, the largest group consisting of ca. 60 bats. The collected females were pregnant, each contained one foetus, their crown-rump length varied from 17.5 to 25.0 mm (mean 21.0 mm; n=6). The generally very similar size of foeti suggests synchronised terms of births, likely to occur in the middle or second half of June, which is more or less in accordance with the data from Iraq and Palestine (Al-Robaae 1966, Mendelsson & Yom-Tov 1999). During a visit on 14 May 2001, no individuals of *A. tridens* were found in the ruins and surrounding buildings. Unlike the main room inhabited by bats in the Afqa Cave in Tadmor (Fig. 52), in Halabiyyeh parts of the colony roosted in spaces only shaded

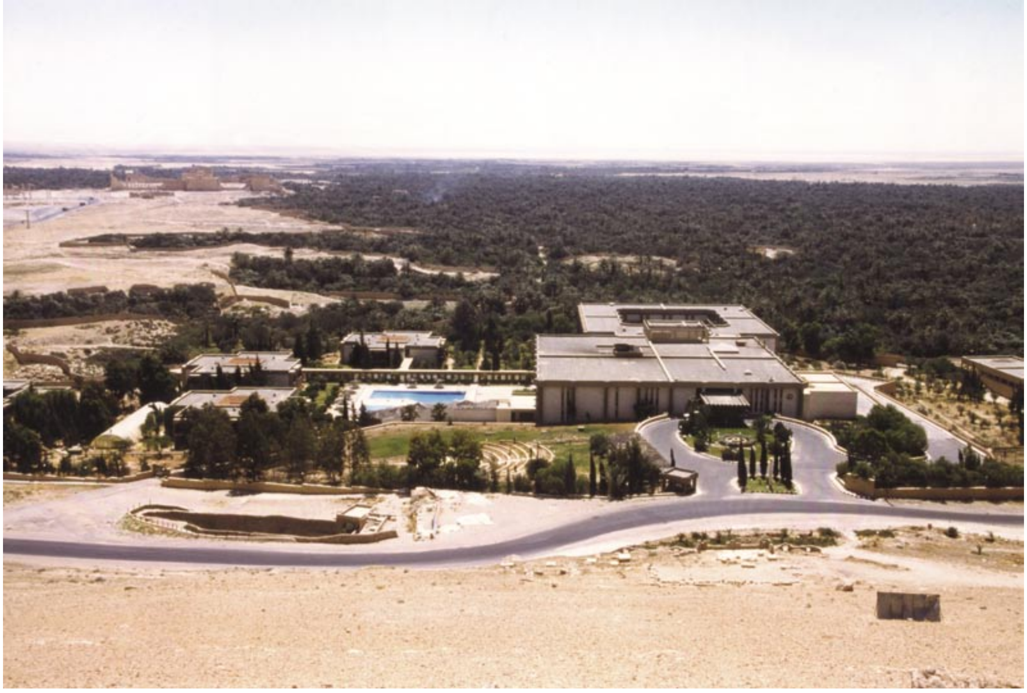

Fig. 51. The oasis of Tadmor (Palmyra). Overall view on the oasis from the west; the modern city and the ancient ruins are in the background, in the foreground left lies the entrance of the Afqa Cave. The oriental baths of the Afqa Cave are now abandoned as they lost water when the extensive hotel complex is built below its spring (photo by M. Kaftan).

from daylight. At daytime, the bats of both colonies were found active and not torpid, similarly as reported by Weber (1955) from Iraq.

In a dark castle cellar of Qala'at ar Rahba, a solitary male was found to roost. Thus, *A. tridens* in Syria was found only in artificial shelters. (Although the Afqa Cave, Tadmor, has a natural part, it was not observed to be used by bats.)

Since *A. tridens* represents a semi-desert element in the fauna of Syria, the species sharing its roosts are of similar ecological definition. In the ruins of Halabiyyeh was found *T. nudiventris* to roost and netted foraged individuals of *P. kuhlii*. In Qala'at ar Rahba were found roosting *T. nudiventris*, *P. kuhlii* and *O. hemprichii*. *P. kuhlii*, *O. hemprichii* and *T. teniotis* were recorded to forage in the oasis of Tadmor along with *A. tridens*.

Similarly as in Iraq (Nader 1969), remains of *A. tridens* were found in owl diet in Syria. We found bones of this species in pellets of *Tyto alba* (six samples from four places), *Asio otus* (three samples from Tadmor) and *Bubo bubo* (two samples from near Tadmor), see Records and Table 35. The remains of *A. tridens* represented 0.09–0.91% per sample of all prey items of *T. alba* diet from Syria (0.11–1.00% of mammalian and 0.57–6.49% of bat items per sample); 0.61–2.14% per sample of all prey items of *A. otus* diet from Syria (1.81–4.22% of mammalian and 58.3–100.0% of bat items per sample); and 0.54 and 1.98% per sample of all prey items of *B. bubo* diet from Syria (0.67 and 2.74% of mammalian and 100% of bat items per sample) (Table 35).

Material examined. 6 inds. (NMP 90360; 1 skull, 5 rostra, 5 left mandibles, 3 right mandibles, from owl pellets), As Salihiyyah, 19 April 2001, leg. J. Obuch; – 1 ind. (NMP 90361; 1 rostrum and a pair of mandibles, from owl pellet), As Salihiyyah, valley ca. 2 km NW of Dura Europos, 19 April 2001, leg. J. Obuch; – 1 fs (SMF 55478 [S+A]), Halabiyyeh, 15–17 August 1978, leg. R. Kinzelbach; – 29 f, 1 m (SMF 74105–74110 [S+Sk+B], 74111–74135 [A]), Halabiyyeh, 1 June 1989, leg. D. Kock; – 9 fa (NMP 48019–48021, 48024–48027 [S+A], 48022, 48023 [S+B]), Halabiyyeh, 17 June 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 3 inds. (NMP 90362; 1 skull, 2 left mandibles, 3 right madibles, from owl pellets), Halabiyyeh, 17 June 1998, leg. J. Obuch; – 17 inds. (NMP 90363; 11 skulls, 6 rostra, 15 left mandibles, 15 right mandibles, from owl pellets), Halabiyyeh, 15 April 2001, leg. J. Obuch; – 1 ma (NMP 48813 [S+A]), Qala'at ar Rahba, 17 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 m (SMF 60365 [S+Sk+B]), Tadmor, 11 March 1979, leg. R. Kinzelbach; – 13 m, 1 ind. (SMF 734111, 73419 [S+Sk], 73407–73410, 73412, 73413 [S+A], 73414–73418 [S+Sk+B]), Tadmor, 20 September 1988, leg. D. Kock; – 16 m, 2 f (SMF 74097, 74099 [S+Sk+B], 74087–74096, 74098, 74100–74104 [A]), Tadmor, 17 May 1989, leg. D. Kock; – 2 ma (NMP 47926 [A], CUP [A]), Tadmor, 30 April and 5 October 1995, leg. M. Kaftan & J. Mlíkovský; – 1 m (ZIN 82633 [A]), Палмыра (Тадмор), пещера Ефка [Palmyra (Tadmor), peščera Efka] (= Tadmor, Afqa cave), 22 February 1996, leg. Coj; – 11 m (NMP 48037, 48038, 48040–48047 [S+A], 48039 [S+B]), Tadmor, 23 June 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 1 ind. (NMP 90366; rostrum and pair of mandibles, from owl pellet), Tadmor, 23 June 1998, leg. J. Obuch; – 5 inds. (NMP 90365; 4 rostra, 1 left maxilla, 1 right maxila, 3 left mandibles, 3 right mandibles, from owl pellet), Tadmor, 23 April 2001, leg. J. Obuch; – 3 m (RLC SY5–7 [A]), Tadmor, 3 October 2004, leg. R. Lučan; – 1 ind. (NMP 90364; rostrum, from owl pellet), Tadmor, 5 km W of ruins, 23 June 1998, leg. J. Obuch; – 3 inds. (NMP 90367; 3 skulls, 2 pairs of mandibles, from owl pellets), Zalabiyyeh, 15 April 2001, leg. J. Obuch.

Morphology. See Table 14 and Appendix III for biometric data on the Syrian specimens of *Asellia tridens*. Baculum extracted from a specimen of *A. tridens* from Syria is shown in Fig. 53.

Taxonomy. *Asellia tridens* is a polytypic species, from two to five subspecies are recognised (Ellerman & Morrison-Scott 1951, Harrison 1957, Kock 1969, Hayman & Hill 1971, Koopman 1975, Corbet 1978, Owen & Qumsiyeh 1987, Koopman 1994, Horáček et al. 2000, Simmons 2005); viz. *A. t. tridens* (Geoffroy, 1813) (terra typica: Egypt; by Kock 1969 restricted to 'Theben, Ägypten'); *A. t. murraiana* (Anderson, 1881) (t.t.: Karachi, Sind, W India [= Pakistan]); *A. t. diluta* Andersen, 1918 (t.t.: El Golea, Algerian Sahara); *A. t. italosomalica* De Beaux, 1931 (t.t.: Oddur, Italian Somaliland [= S Somalia]); and *A. t. pallida* Laurent, 1937 (t.t.: Oued Tata, Anti-Atlas, SW Morocco). However, the latter form is often considered to be a synonym of *A. t. diluta* (see e.g. Corbet 1978, Koopman 1994, Horáček et al. 2000), which again has been synonymised either with *A. t. murraiana* (Kock 1969, Koch-Weser 1984) or *A. t. tridens* (Laurent 1942, Owen & Qumsiyeh 1987).

The Palaearctic populations of *A. tridens*, including those of North Africa, the Middle East, Afghanistan and Pakistan, have most often been assigned to three forms; *A. t. diluta* living in the Maghreb, *A. t. tridens* which is considered to occur in Egypt and surrounding areas, and *A. t. murraiana* in the eastern portion of the species range, from Lower Mesopotamia to the east. However, the taxonomic status of populations inhabiting transition parts of the species range between Upper

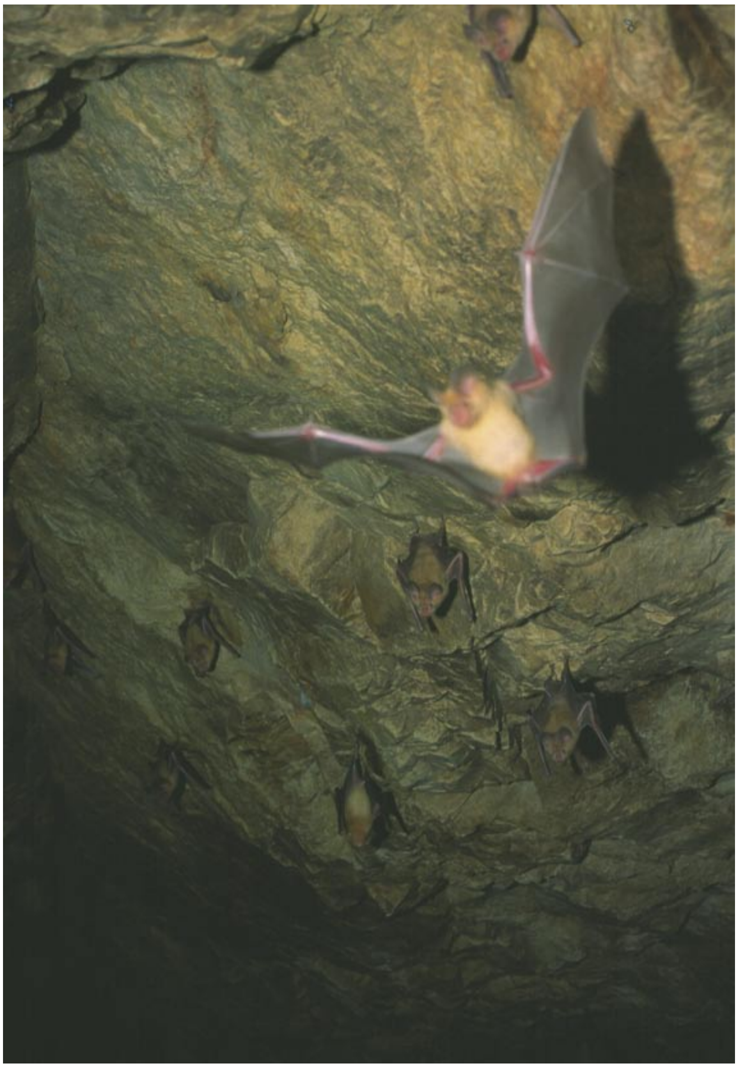

Fig. 52. The oasis of Tadmor (Palmyra). Colony of *Asellia tridens* (Geoffroy, 1813) in the terminal portion of the artificial corridor of the Afqa Cave observed on 21 May 2001, when the whole number of bats is estimated about 800 individuals (photo by A. Reiter).

Egypt (where the nominotypical form was described) and Iraq (where the form *murraiana* has been regularly reported, see e.g. Sanborn 1940, Tate 1941a, Weber 1955, Harrison 1957, 1964a, Hatt 1959, Kock 1969, Harrison & Bates 1991, etc.), including Lower Egypt, Palestine, northern Arabia and Syria, remains unclear according to the opinions presented by various authors.

Harrison (1957) first revised populations of *A. tridens* coming from the Middle East and mentioned occurrence of *A. t. tridens* in the whole Egypt and in eastern Arabia and of *A. t. murraiana* in Iraq, Pakistan and Yemen, while in Sinai and western Arabia he found 'intermediate populations'; he did not find sufficient material available for any statement concerning the Palestinian populations. Bodenheimer (1958: 172) concluded that Palestinian population "seems to be a transient to the Arabian *A. t. murraiana* which probably is only a cline form of *A. t. tridens* and thus does not deserve a trinomial name". Harrison (1964a: 97) reviewed that "the two races intermediate in Palestine and NW Arabia" and "*A. t. murraiana* is found in Iraq and the Aden district; the typical subspecies is found in Oman, Hofuf and Dhufar, while intermediation [between *tridens* and *murraiana*] certainly occurs in Palestine, Sinai and the Hejaz". Atallah & Harrison (1967: 314) reported the first record of *A. tridens* in Syria (three specimens from Tadmor), however they "are unable to say for certain which subspecies this population represent, but they may well be intermediate between the larger *murraiana* found in Iraq and the smaller *tridens* of Egypt". Kock (1969) revised an extensive set of published data on *A. tridens* from the most of its distribution range and finally accepted only two subspecies in the whole range; *A. t. tridens* in Upper Egypt, Somalia and eastern Arabia, and *A. t. murraiana* in the Maghreb, Lower Egypt and the Near East, including Sinai, Palestine, Syria and Iraq; he considered other African and Arabian populations to be of uncertain subspecific position, however, he did not accept any intermediate stages. Atallah (1977) regarded the Levantine populations to be treated as of *A. t. murraiana*. In his synthetic

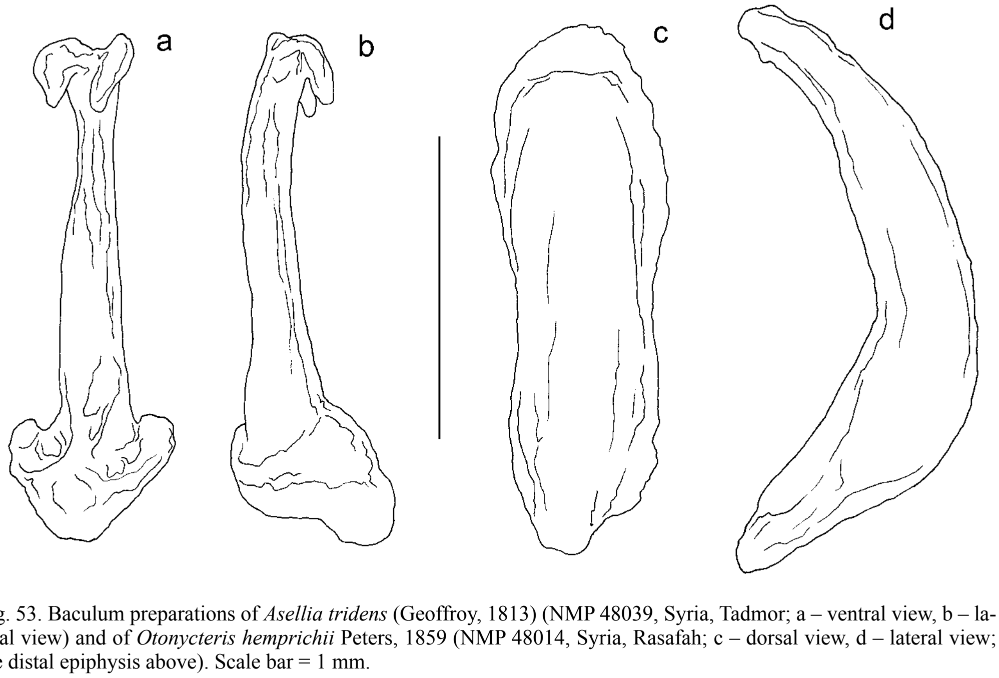

Fig. 53. Baculum preparations of *Asellia tridens* (Geoffroy, 1813) (NMP 48039, Syria, Tadmor; a – ventral view, b – lateral view) and of *Otonycteris hemprichii* Peters, 1859 (NMP 48014, Syria, Rasafah; c – dorsal view, d – lateral view; the distal epiphysis above). Scale bar = 1 mm.

Table 14. Basic biometric data on examined Syrian and comparative samples of *Asellia tridens* (Geoffroy, 1813). For abbreviations see pp. 10, 11

	Syria (Tadmor)					Syria (Euphrates Valley)					Iraq, Iran & Afghanistan				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	25	**52.14**	49.0	54.5	1.506	17	**51.56**	48.6	55.0	1.441	15	**53.44**	52.0	55.8	0.950
LCr	26	**19.07**	18.42	19.71	0.316	17	**18.98**	18.17	19.88	0.443	26	**18.96**	18.17	19.52	0.351
LCc	26	**16.81**	16.34	17.30	0.270	17	**16.66**	15.87	17.75	0.443	32	**16.80**	15.95	17.58	0.372
LaZ	26	**10.71**	10.19	11.18	0.215	16	**10.55**	9.92	11.12	0.322	32	**10.60**	10.15	11.03	0.221
LaI	26	**2.34**	2.14	2.56	0.099	17	**2.36**	2.18	2.57	0.103	35	**2.33**	2.15	2.65	0.104
LaN	26	**7.52**	7.18	7.76	0.159	17	**7.64**	7.32	8.07	0.189	31	**7.53**	7.15	8.02	0.222
ANc	25	**5.67**	5.37	6.03	0.166	17	**5.49**	5.08	5.78	0.212	15	**5.52**	5.16	5.77	0.207
CC	26	**5.37**	5.18	5.69	0.131	17	**5.26**	4.75	5.92	0.248	23	**5.38**	4.87	5.71	0.178
M^3M^3	26	**7.51**	7.21	7.92	0.193	17	**7.51**	7.04	7.92	0.216	21	**7.54**	7.22	7.76	0.129
CM^3	26	**6.83**	6.62	7.02	0.113	17	**6.83**	6.61	7.17	0.144	37	**6.88**	6.44	7.21	0.169
LMd	26	**12.82**	12.33	13.18	0.256	17	**12.67**	12.17	13.57	0.350	35	**12.72**	12.11	13.20	0.286
ACo	26	**4.12**	3.82	4.48	0.147	17	**4.06**	3.75	4.49	0.170	22	**4.15**	3.77	4.44	0.172
CM_3	26	**7.52**	7.32	7.69	0.111	16	**7.44**	7.11	7.77	0.161	36	**7.53**	7.02	7.97	0.199

	Maghreb					U Egypt, Siwa & S Libya					Sudan				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	37	**50.64**	48.3	53.5	1.275	16	**48.38**	47.3	50.8	0.981	13	**49.80**	46.0	52.5	1.618
LCr	36	**19.16**	18.36	19.78	0.324	26	**18.31**	17.52	18.98	0.353	18	**18.64**	18.12	19.64	0.414
LCc	37	**16.94**	16.14	17.54	0.290	26	**16.11**	15.58	16.64	0.234	18	**16.40**	15.90	17.27	0.323
LaZ	37	**10.61**	9.92	11.12	0.251	25	**10.24**	9.48	11.03	0.331	18	**10.44**	10.17	10.92	0.208
LaI	37	**2.37**	2.11	2.57	0.102	26	**2.26**	2.12	2.46	0.087	18	**2.43**	2.22	2.72	0.139
LaN	37	**7.58**	7.13	7.88	0.174	26	**7.23**	6.89	7.53	0.166	18	**7.49**	7.24	7.78	0.134
ANc	37	**5.69**	5.16	6.08	0.170	26	**5.50**	5.12	5.74	0.183	18	**5.55**	5.18	6.04	0.230
CC	37	**5.43**	5.05	5.70	0.147	26	**5.15**	4.81	5.51	0.192	18	**5.24**	5.01	5.74	0.186
M^3M^3	37	**7.55**	7.08	7.98	0.205	26	**7.25**	6.95	7.85	0.215	18	**7.44**	7.11	7.76	0.206
CM^3	37	**6.90**	6.61	7.22	0.118	26	**6.64**	6.41	6.89	0.135	17	**6.76**	6.47	7.01	0.146
LMd	37	**12.97**	12.21	13.48	0.255	25	**12.34**	11.88	12.71	0.229	18	**12.58**	12.21	13.42	0.309
ACo	37	**4.10**	3.86	4.37	0.147	25	**3.97**	3.72	4.42	0.164	18	**4.05**	3.82	4.38	0.145
CM_3	37	**7.62**	7.23	7.93	0.128	25	**7.35**	7.08	7.63	0.137	18	**7.44**	7.04	7.89	0.227

review of Palaearctic mammals, Corbet (1978) introduced an alternative conception of only two subspecies in *A. tridens*; in the whole species range with the exception of northwestern Africa (where he suggested a presence of *A. t. diluta*) he mentioned only the nominotypical form.

Nader & Kock (1983c: 2) presented a second record of *A. tridens* from Syria (Halabiye [= Halabiyyeh]) and discussed again the taxonomic position of Syrian populations; they identified the Hallabiyyeh specimen as *A. t. murraiana*, but concluded that "more specimens for a detailed taxonomic study are needed". Qumsiyeh (1985: 43) stated that the material from Palestine examined by him "was slightly larger than the S Egyptian material but does not approach the size of *A. t. murraiana* of Iraq". A broad taxonomic analysis of *A. tridens* from almost its whole distribution range was carried out by Owen & Qumsiyeh (1987). They found only two subspecies within the range; they reported *A. t. murraiana* separately from the Middle East (except for Yemen) and from West Africa, while *A. t. tridens* was mentioned to occur in the remaining African countries and in Yemen. This revision was not fully accepted in respect to Arabian forms by Harrison & Bates (1991), who reffered *A. t. muraiana* from Iraq and Yemen, which they reported to intermediate with *A. t. tridens* in the Levant and northwestern Arabia. Mendelssohn & Yom-Tov (1999) and Ferguson (2002) reported *A. t. tridens* from Palestine without any additional comments.

In conclusion, the Syrian and other Levantine populations are reported by various authors either as *A. t. murraiana*, or as *A. t. tridens* or as an intermediate form between them. Most of the authors (e.g. Harrison 1957, 1964a, Kock 1969, Nader & Kock 1983c, Owen & Qumsiyeh 1987, Harrison & Bates 1991) considered body and skull sizes to be the main characters distinguishing the two subspecies. Harrison (1957) and Harrison & Bates (1991) suggested also possible importance of pelage coloration and/or presence of rufous phases in the coloration of the respective population; they concluded that erythristic individuals seem to be unusual in *A. t. murraiana*, but more common in *A. t. tridens*. However, Kock (1969) as well as Owen & Qumsiyeh (1987) doubted the validity of individual coloration for any taxonomic assignment.

The size relations of Syrian samples of *A. tridens* are presented in Table 14 and Fig. 54. Both Syrian samples are of approximately the same range of dimension values, and they well cover the variance range of samples coming from the easternmost part of the species range, i.e. from Iraq, Iran and Afghanistan, where only *A. t. murraiana* was reported (Harrison 1957, Aellen 1959, Harrison 1964a, DeBlase 1980, Harrison & Bates 1991, Corbet & Hill 1992, Bates & Harrison 1997, Horáček et al. 2000, etc.). Thus, the Syrian populations of *A. tridens* are most fit to be classified as *A. t. murraiana* (Anderson, 1881).

Moreover, the sample of *A. t. tridens* from Upper Egypt has much smaller size than of Syrian as well as other compared Middle Eastern bats, although there is approximately a 50% overlap in the variation ranges (Fig. 54). Only one specimen of *A. tridens* of a Palestinian origin was available for our comparison and its size values just fall in this overlap, therefore the data say nothing about the taxonomic position of the Palestinian population. However, the measurements

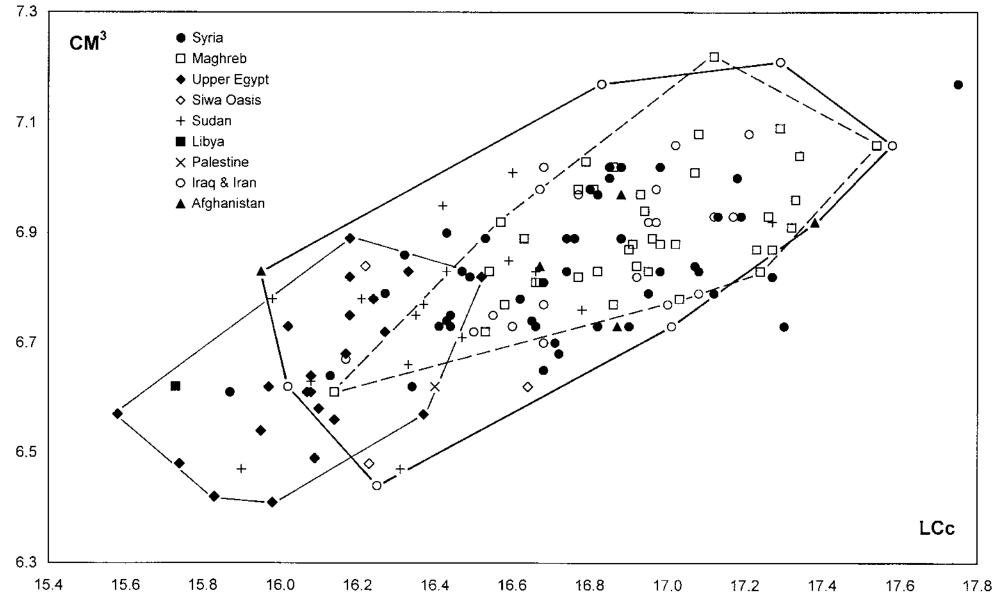

Fig. 54. Bivariate plot of examined Syrian and comparative samples of *Asellia tridens* (Geoffroy, 1813): condylocanine length of skull (LCc) against the length of upper tooth-row (CM^3). Explanation: thin-lined polygon = samples of the Upper Egypt and southern Libya (n=26), i.e. *A. t. tridens*; bold-lined polygon = samples of Iraqi and Persian Mesopotamia and of Afghanistan (n=32), i.e. *A. t. murraiana*; dashed polygon = Maghrebian samples (n=37).

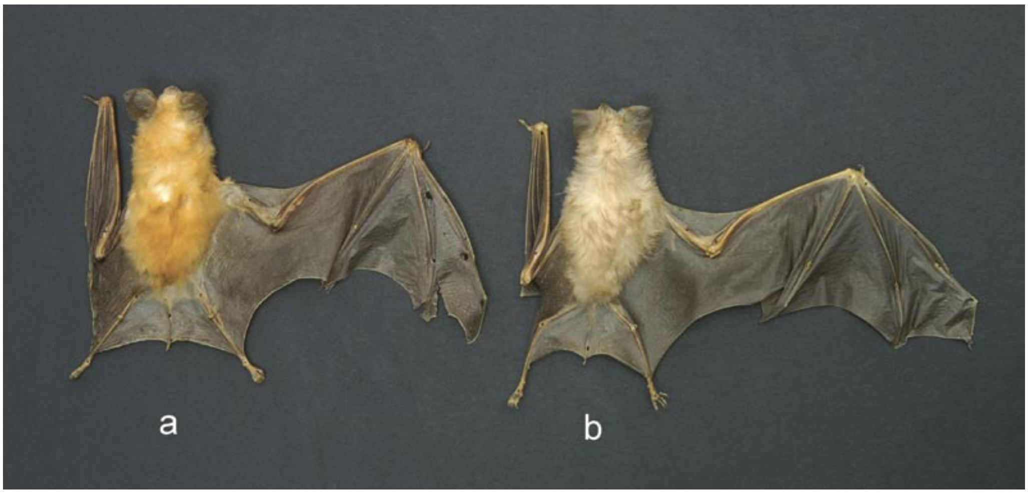

Fig. 55. Pelage coloration in *Asellia tridens* (Geoffroy, 1813) from Syria: a – female, NMP 48022, Halabiyyeh; b – male, NMP 48039, Tadmor, Afqa Cave.

given by Mendelssohn & Yom-Tov (1999) for Palestinian bats fit well into the variation range of our examined samples of *A. t. murraiana* from the northern and eastern parts of the Middle East (Syria, Iraq, Iran and Afghanistan); LAt was in the Palestinian bats 48–52 mm (n=16), in the NE Middle Eastern bats 48.6–55.8 mm (n=57), LCc 16.2–17.6 mm (n=16) and 15.9–17.8 mm (n=75), CM^3 6.2–7.1 mm (n=16) and 6.4–7.2 mm (n=80), respecively, etc. The same size relations as the Syrian, Iraqi, Persian and Afghani populations were found also in bats from the Maghreb (Algeria and Tunisia) which seem to be identical with *A. t. murraiana*, while the only specimen from Fezzan, southwestern Libya is close by its measurements to the lower margin of the variation range of *A. t. tridens* and well pertains to this form. These results confirm the conclusions by Kock (1969) and Nader & Kock (1983c), partly also those by Owen & Qumsiyeh (1987).

Unfortunately, we did not examine any material from Lower Egypt and its taxonomic position remains uncertain (see e.g. Kock 1969 and Owen & Qumsiyeh 1987). On the other hand, the typically intermediate position between the two mentioned subspecies is shown by bats from Sudan, however in mean values these samples are closer to *A. t. tridens* from Upper Egypt, and they are also geographically the nearest to this form (cf. Owen & Qumsiyeh 1987).

The pelage coloration of the Syrian individuals of *A. tridens* showed both rufous and pale greyish phases (Figs. 55, 56). In the examined sample of 15 bats from Tadmor, the ratio of rufous : non rufous specimens was 1:2, in the sample of 10 bats coming from the Euphrates Valley of Syria, 1:1, respectively. One rufous individual was also present in a sample of 13 specimens of *A. tridens* from southwestern Iran. Additionally, von Wettstein (1913) mentioned several individuals found in a sample of 43 bats from Mosul, northern Iraq, to be 'braunrot' (= rufous). Thus, the erythristic individuals seem to be regularly present in the Syrian and geographically close populations of *A. t. murraiana*, making up 40% of the examined Syrian individuals.

FEEDING ECOLOGY. *Asellia tridens* is a medium-sized desert bat with high echolocation frequency (see below) which forages frequently in cluttered habitats and its strategy is analogous to that in the family Rhinolophidae. The prevailing food of *A. tridens* is composed of the representatives of

Coleoptera, although Hymenoptera, Lepidoptera, Heteroptera, Orthoptera and Diptera may also make up an important proportion of the diet at a particular site and season (Whitaker et al. 1994, Mendelssohn & Yom-Tov 1999, Feldman et al. 2000, Whitaker & Yom-Tov 2002). We observed this species several times to forage on beetles in a hovering flight above cowpats in the Persian Mesopotamia; the faeces analysis proved Coleoptera to be the most frequent prey category there, followed by Heteroptera and Auchenorrhyncha (Benda et al. 1999b).

We analysed four samples of faeces of *A. tridens* from Syria; three samples from Tadmor and one from Halabiyyeh. The main prey category was represented by Coleoptera, especially Scarabaeidae. Representatives of Lepidoptera, Orthoptera, Hymenoptera and Auchenorrhyncha were also found to be important items (Fig. 57). One digestive tract from the bat collected at the Qala'at ar Rahba contained 90% of volume of Trichoptera and 10% of Carabidae.

Our diet analyses and observations correspond with the results obtained in previous studies and confirm Coleoptera to be a crucial prey category in *A. tridens*.

Echolocation. The echolocation calls of *Asellia tridens* were recorded at one site in Syria (Tadmor, 6 October 2004; Fig. 58) where hundreds of individuals emerged from an extensive underground system of the Afqa Cave. Five echolocation sequences, emitted most probably by five different individuals, were recorded and analysed (see Table 15). We observed one individual foraging close to the ground in the semi-desert areas around, where it presumably gleaned prey from vegetation and ground surface.

Echolocation calls of the African populations of *A. tridens* have been described by Möhres & Kulzer (1955a, b), Pye (1972), Gustafson & Schnitzler (1979) and Jones et al. (1993) who noted age and sex dependent echolocation parameters: juveniles used lower frequencies than did adults, and males were lower in their frequencies than females. Also, body size dependence of echolo-

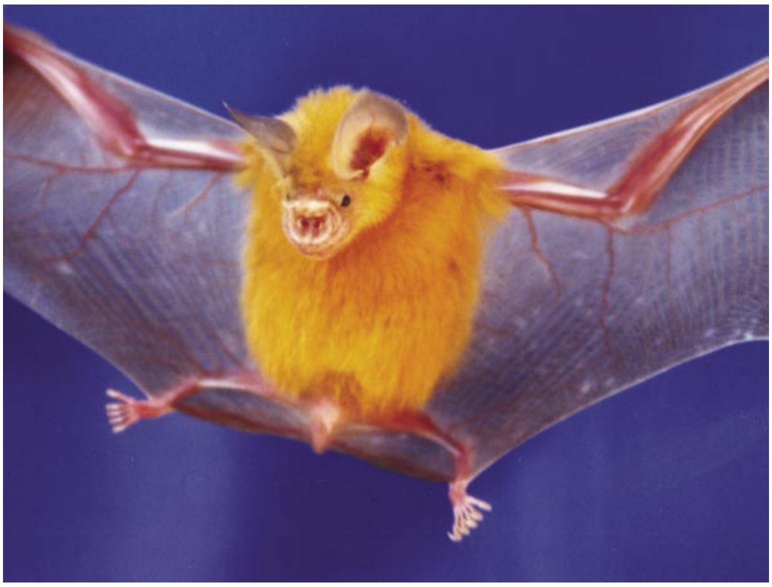

Fig. 56. Female of the rufous coloration type of *Asellia tridens* (Geoffroy, 1813) from the ruins of Halabiyyeh (photo by M. Andreas).

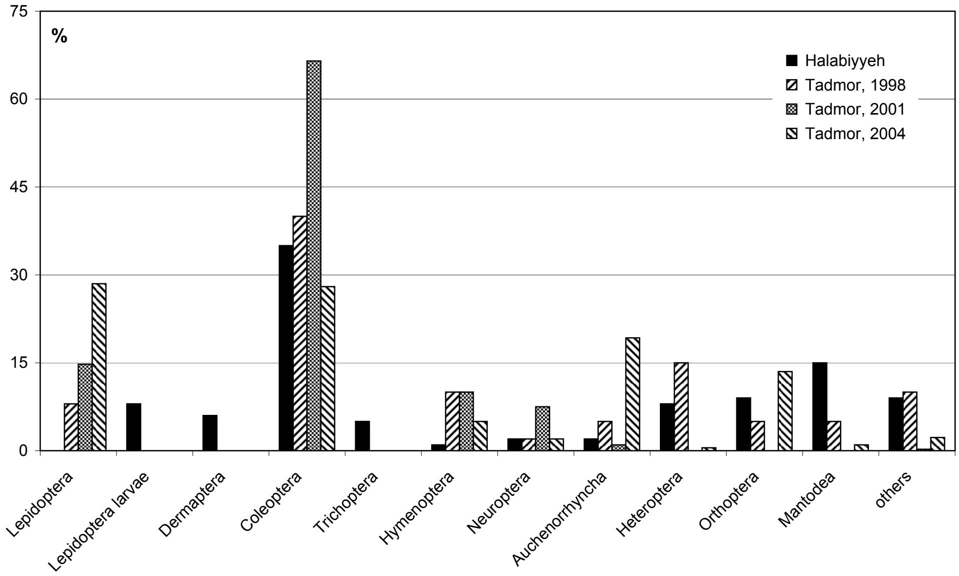

Fig. 57. Volume of particular food items in the diet of *Asellia tridens* (Geoffroy, 1813) from Syria.

cation parameters was proved among adults: CF frequencies were related to forearm lengths in a polynomial manner. Slight differences were found between our data and those described by Jones et al. (1993) from Africa. The variation range of the frequency with maximum energy (Fmax) in the CF component of the call was lower in Syrian *A. tridens* than in the African samples, while the mean of Fmax was higher in our observations. As juveniles have been described to produce

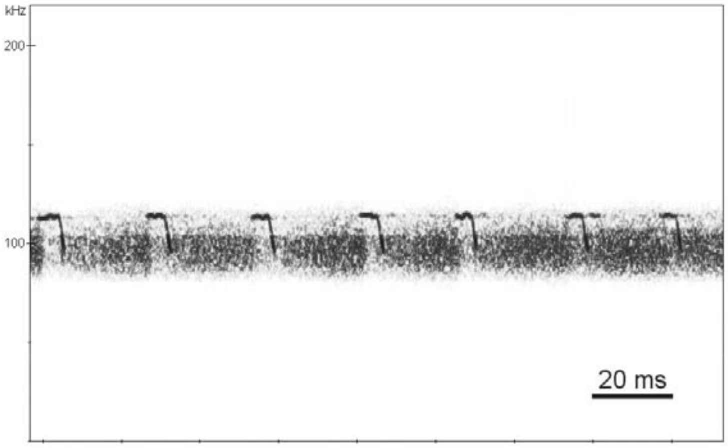

Fig. 58. Spectrogram of echolocation calls of *Aselia tridens* (Geoffroy, 1813). An individual departing from the underground day roost (Afqa Cave) at Tadmor.

Table 15. Descriptive parameters of echolocation calls in five examined bat species from Syria. Explanation: N – number of individual calls analysed (in parentheses number from which were obtained call sequences); SF – start frequency; EF – end frequency; Fmax – frequency with maximum energy; D – call duration in ms; IPI – inter-pulse interval; upper lines: mean±SD, lower lines: range

species	N	SF	EF	Fmax	D	IPI
Asellia tridens	24 (5)	116.4±1.9 113.0–119.0	97.1±3.0 94.0–103.0	117.4±2.1 113.5–119.6	9.0±2.1 6.4–12.0	23.7±10.0 10.2–45.5
Hypsugo savii	6 (2)	37.1±1.4 36.0–38.7	33.2±1.1 32.0–34.1	34.8±0.9 33.8–36.2	11.9±1.6 10.6–15.0	243.2±134.3 103.0±410.0
Pipistrellus pipistrellus	57 (15)	60.2±4.5 47.3–67.4	47.7±1.7 44.4–51.3	50.0±1.7 46.1–54.0	6.4±1.3 4.0–10.2	88.5±18.3 61.0–168.0
Pipistrelles kuhlii	86 (18)	55.2±6.9 39.5–66.6	38.4±2.3 33.8–43	41.6±1.9 36.3–46	6.7±1.7 3.7–12.8	88.5±14.9 57.0–149.0
Tadarida teniotis	7 (3)	16.5±2.5 12.6–19.1	10.2±1.2 9.3–12.3	12.2±1.4 10.6–14.5	20.1±2.3 16.0–26.0	484.3±135.3 390.0–685.0

lower Fmax (Jones et al. 1993), the differences may be explained by the fact that only adult individuals (males) were found to use the roost where the calls were recorded. Since *A. tridens* remains the only species of the family Hipposideridae in Syria, which possesses unique features of echolocation parameters when compared with bats of other families present in the country, it could be reliably identified with a help of bat detectors. However, the use of such technique for monitoring of this species in the field may not be too efficient due to low intensity of the calls and thus, the low detectability of flying individuals (i.e. the situation analogical to rhinolophids – cf. e.g. Ahlén 1991).

Myotis myotis (Borkhausen, 1797)

Records. **Original data**: Al Lathiqiyeh: Al Lathiqiyeh [1], 2 fa (specimens in MNHN). – Homs: Qala'at al Hosn [2], ruins of Krak des Chevaliers, castle cellar, 18 October 2004: coll. 1 fa. – Tartus: Qala'at al Marqab [3], castle ruins, 1 June 2001: coll. 2 ma. – **Published data**: Dimashq: Djéroud (= Jeiroud), NE de Damas (= Dimashq), April–June 1908: 2 inds. (Trouessart & Kollmann 1923; but one of these bats was identified as *M. blythii*, the other one as *O. hemprichii*, see below). – Halab: Aleppo Bazar (= Halab), before 1754 (Russel 1794; the species assignment is doubtful); Aleppo (= Halab) [4], 4 July 1914: 2 ma, 6 fa (Spitzenberger 1996). – Homs: Krak des Chevaliers (= Qala'at al Hosn, Krak des Chevaliers) [2], dungeon, 23 July 1977: 1 ind. from an owl pellet (Nadachowski et al. 1990); – Tell Kalakh (= Talkalakh) [5], 8 December 1952: 1 f (Harrison & Lewis 1961; this record possibly denotes the previous locality, as in *M. blythii*, see below). – Quneitra / Golan Heights: Bei Banyas (= near Baniyas) [6] (as *Vespertilio murinus*, Aharoni 1930); Banias (= Baniyas) near Mt Hermon, 5 October 1947 (Theodor 1967); – Mount Hermon and Golan, two unidentified records mapped in central and northern parts of this region [roughly the areas of Mount Hermon and Katsrin] (Mendelssohn & Yom-Tov 1999).

Possible records (Syria *sensu lato*). **Original data**: Syria, 1860: 1 ind., leg. Blanche (specimen in MNHN). – **Published data**: Syrie, 1878: 2 inds. ad., du Musée de Berlin, vend. Schneider (Jentink 1887, 1888)

Distribution. **General**. *Myotis myotis* is a species with north-Mediterranean type of distribution (Corbet 1978, Horáček et al. 2000, Güttinger et al. 2001). It occurs from southwestern Europe (perhaps incl. the Azores) and southern England over southern and central Europe (incl. some Mediterranean islands) to southwestern Ukraine, Asia Minor and the Levant (Koopman 1994, Spitzenberger 1996).

Near East. *M. myotis* occurs in the western part of the Near East, its records are known from Turkey and the Levant (Harrison & Bates 1991, Benda & Horáček 1998, Mendelssohn & Yom-

-Tov 1999, our data). Until present, *M. myotis* has not been with certainty confirmed in Cyprus nor in Iran, although from the latter country this species used to be mentioned, most probably erroneously (see DeBlase 1980 and Sharifi et al. 2000). In the Near East, *M. myotis* reaches eastern and southern margins of its distribution range. Since two very similar mouse-eared bats occur in sympatry in the Mediterranean, some records made in the Near East can be erroneous, as shown by Harrison & Lewis (1961) and some subsequent authors. Thus, some older records of *M. myotis* can be actually of *M. blythii*, ad vice versa.

In western and central parts of Anatolia, *M. myotis* is one of the most common species (Kahmann & Çağlar 1960, Çağlar 1965, 1969, von Lehmann 1966, Corbet & Morris 1967, DeBlase & Martin 1973, Kock 1974, Felten et al. 1977, Peus 1978, von Helversen 1989, Albayrak 1990a, 1993a, 2003, Obuch 1994, Steiner & Gaisler 1994, Spitzenberger 1996, Hasbenli 1997, Albayrak & Aşan 1998, 2001, Benda & Horáček 1998, Özgül et al. 2000, Karataş et al. 2004). However, in eastern Turkey, this species reaches eastern margin of its distribution range along the approximate line Artvin – Diyarbakir – Birecik (Kahmann & Çağlar 1960, Spitzenberger 1996, Albayrak 2003).

M. myotis is distributed along the Levantine coast, from Cilicia and Hatay in Turkey, through Syria, Lebanon to northern Palestine (Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999, our data), as well as in slightly arid regions in northwestern Syria and southern Turkey (Spitzenberger 1996). In Lebanon, this species has been recorded both along the Mediterranean coast and in the Bekaa Valley (Tristram 1866, Harrison & Lewis 1961, Lewis & Harrison 1962, Atallah 1970, our unpubl. data). Several records of *M. myotis* have been reported from northern Palestine, including the Hula Valley, Coastal Plains and the Galilee (Theodor 1954a, 1967, Theodor & Moscona 1954, Makin 1977, Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999), while in Jordan this species has not yet been recorded (Amr et al. 2004).

Syria (Fig. 59). *M. myotis* is a medium-frequent bat in Syria, seven to eight confirmed records are available (Table 1). It inhabits the Mediterranean woodland zone along the sea coast and in the Rift mountain chains [1–3, 5, 6] (Harrison & Lewis 1961, Theodor 1967, Nadachowski et al. 1990, Mendelssohn & Yom-Tov 1999, our data) as well as the transient zone of the Mediterranean steppe-maquis in northwestern Syria [4] (Spitzenberger 1996). These records well connect known distribution in Turkey in the north and in Lebanon and Palestine in the south. The records in Turkish Birecik and in Syrian sites of Halab, Talkalakh, and the Golan Heights denote southeastern margin of the species distribution range.

The oldest reference from present-day Syria which could be assigned to *M. myotis* has been that of *Vespertilio murinus* from Aleppo Bazar by Russell (1794). However, this species affiliation is very tentative, because Russell's (1794) mention has considered "two varieties [...]; the other sort is rarely observed, they are white and have ears longer than those of the former". Thus, the 'rarely observed variety' of '*V. murinus*' most probably represented *Otonycteris hemprichii* (see Shehab et al. 2004 and below), however the other one might represent whatever species of 'mouse-like' bat (cf. *murinus*), i.e. any member of the family Vespertilionidae.

Some authors mentioned 'Syria' as a part of the distribution range of *M. myotis* (s.l. = a complex of *M. myotis* and *M. blythii*) (Kolenati 1860, Fitzinger 1871, Dobson 1876). Specimens of this species coming from 'Syria' were published by Jentink (1887, 1888), however, no later reference which would comment these specimens and/or records (their fate, clear origin or exact species identification) is available in the literature (see e.g. Harrison 1964a, Kumerloeve 1975b, Harrison & Bates 1991).

The first accurate record attributed to *M. myotis* from the present-day territory of Syria was published by Trouessart & Kollmann (1923). These authors mentioned "deux spécimens dans l'alcool" of *M. myotis* from Djéroud (= Jeiroud). Both these specimens (a male and a female),

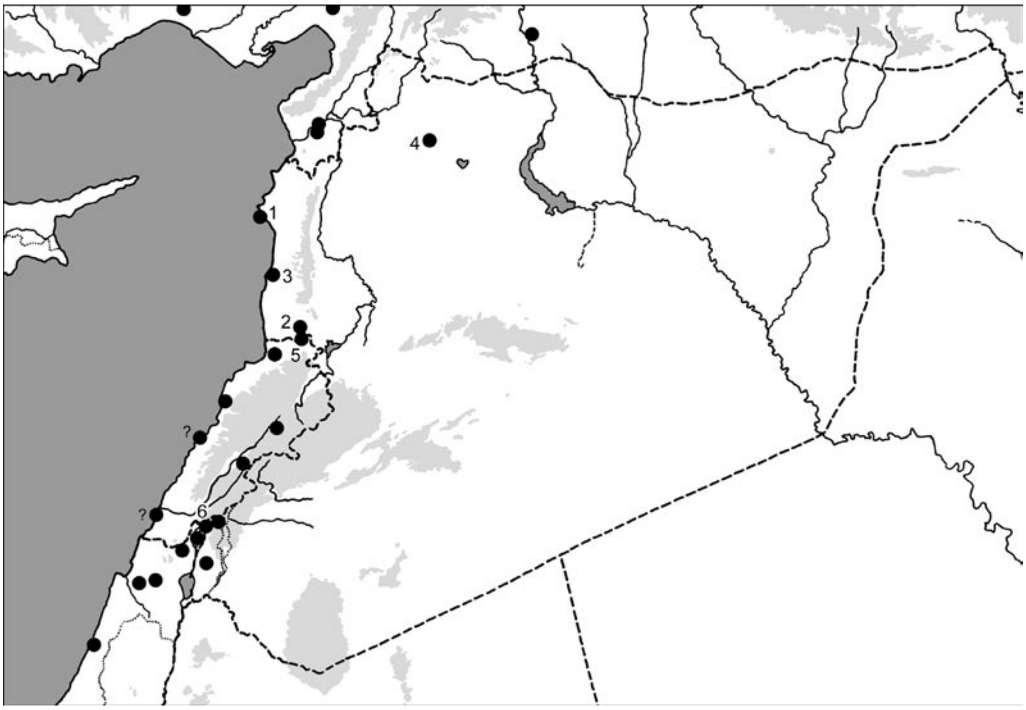

Fig. 59. Records of *Myotis myotis* (Borkhausen, 1797) in Syria and surrounding areas.

which were collected by Henri Gadeau de Kerville in 1908, are still deposited in MNHN under the numbers 1983-1484, 1983-1485 (complete specimens in alcohol). However, the former individual (female, MNHN 1983-1484) has been identified as *M. blythii*, the latter one (male, MNHN 1983-1485) as *O. hemprichii* (see below). A mention of *Vespertilio murinus* Schreber (= *M. myotis* s.l.) by Aharoni (1930) from near Baniyas is also doubtful concerning exact specific identification, because no reference specimen is available. Actually, the occurrence of *M. myotis* s.s. in the present-day Syria has been published first by Harrison & Lewis (1961) from Tall Kalakh (= most probably Qala'at al Hosn), while the older ones remain doubtful.

The MNHN collection contains some more individuals of *M. myotis*; a dry skin specimen (1860-486) labelled 'Syrie, leg. Blanche' and two alcohol specimens (1876-335, 336) from Lattakié (= Al Lathiqiyeh) collected by Fernand Lataste. All these bats have been identified without any doubts as *M. myotis* s.s. according to ear and wing measurements.

FIELD NOTES. In Syria, *Myotis myotis* was recorded only in its roosts situated in artificial shelters. Two adult males were found in the basement of the chapel of the Qala'at al Marqab castle (Fig. 60; it shared the ruins together with *M. blythii*, *M. nattereri* and *E. anatolicus*) and an adult female was collected from a ceiling fissure in the dungeon of Krak des Chevaliers (Qala'at al Hosn) (together with *R. ferrumequinum* and *R. hipposideros*; Fig. 8).

Mendelssohn & Yom-Tov (1999) reported males with large testes caught in mid-June on Mount Hermon. Nadachowski et al. (1990) reported remnants of one individual from an owl pellet collected in Krak des Chevaliers.

MATERIAL EXAMINED. 2 ma, 6 fa (NMW 22040–22047 [S+A]), Aleppo (= Halab), 4 July 1914, leg. V. Pietschmann, Armenien-Expedition 1914 (the NMW series of 220040–22055, composed by *M. myotis* and *M. blythii* considers also a group of specifically not identified juvenile specimens, 9 mj, 7fj [A]); – 2 fa (MNHN 1876-335, 336 [A]), Lattakié (= Al Lathiqiyeh), leg. F. Lataste; – 2 ma (NMP 48915, 48916 [S+A]), Qala'at al Marqab, 1 June 2001, leg. M. Andreas, A. Reiter & D. Weinfurtová; – 1 fa (BMNH 61.391 [S+B]), Tall Kalakh, 8 December 1952, leg. D. Potter; – 1 fa (NMP 90289 [S+A]), Qala'at al Hosn, 18 October 2004, leg. R. Lučan; – 1 ind. (MNHN 1860-486 [B, skull inside]), Syrie, 1860, leg. Blanche.

MORPHOLOGY. See Table 16 and Appendix III for biometric data on the Syrian specimens of *Myotis myotis*.

TAXONOMY. According to the data given by the most recent authors (Castela et al. 2000, Topál & Ruedi 2001, comp. Benda & Horáček 1995a, b, Spitzenberger 1996, Arlettaz et al. 1997a), two subspecies are recognised in the species rank of *Myotis myotis* (Corbet 1978, Koopman 1994, Güttinger et al. 2001, Simmons 2005), viz. *M. m. myotis* (Borkhausen, 1797) (terra typica: Thuringia, Germany) and *M. m. macrocephalicus* Harrison et Lewis, 1961* (t.t.: cave 2 km E of Amchite, Lebanon). These two forms are likely to meet in the western part of the Near East (Strelkov 1972,

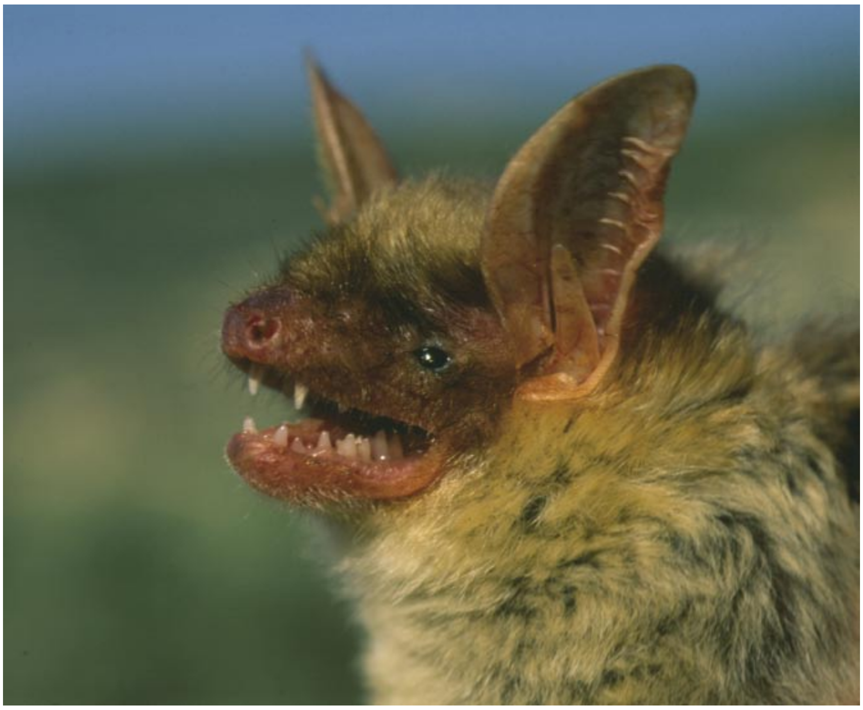

Fig. 60. Portrait of *Myotis myotis* (Borkhausen, 1797) from Qala'at al Marqab (photo by A. Reiter).

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* NOTE. Jentink (1887, 1888) mentioned two specimens of '*Vespertilio murinus*' coming from 'Syrie' (= Syria *sensu lato*) deposited in the collection of Leiden Museum under a name *Taphozous syriacus*. This name is apparently a nomen nudum, which represents a senior unavailable synonym of the name *M. myotis macrocephalicus* Harrison et Lewis, 1961 or *M. myotis omari* Thomas, 1905, as the name *V. murinus* given by Jentink might include both *M. myotis* and *M. blythii* of the present days.

Table 16. Basic biometric data on examined Syrian and comparative samples of *Myotis myotis* (Borkhausen, 1797). For abbreviations see pp. 10, 11

			Syria					Hatay & Lebanon					Turkey (other than the Levant)		
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	5	**66.52**	64.3	67.7	1.342	5	**65.90**	62.8	68.1	2.190	5	**63.94**	61.2	67.2	2.384
LCr	12	**25.52**	24.58	26.15	0.417	11	**25.22**	24.58	25.93	0.416	12	**24.69**	23.73	25.28	0.437
LCb	12	**24.40**	23.57	24.82	0.372	11	**24.01**	23.30	24.47	0.416	12	**23.63**	23.02	24.25	0.462
LaZ	12	**16.27**	15.56	16.78	0.288	11	**15.95**	15.54	16.34	0.321	9	**15.66**	15.25	16.07	0.269
LaI	12	**5.22**	5.02	5.39	0.117	11	**5.23**	5.04	5.43	0.123	12	**5.15**	4.95	5.40	0.132
LaN	12	**10.36**	9.59	10.83	0.348	11	**10.25**	9.86	10.82	0.257	12	**10.23**	9.78	10.43	0.163
ANc	12	**8.65**	8.19	8.87	0.224	11	**8.57**	8.09	8.88	0.213	12	**8.40**	8.05	8.58	0.151
CC	12	**6.53**	6.27	6.70	0.135	11	**6.41**	6.16	6.65	0.154	9	**6.27**	5.98	6.42	0.146
M^{3}M^3	12	**10.54**	10.14	10.82	0.192	11	**10.25**	9.74	10.70	0.322	11	**9.99**	8.82	10.50	0.482
CM^3	12	**10.82**	10.56	11.07	0.158	11	**10.74**	10.47	11.20	0.235	9	**10.45**	9.91	10.83	0.285
LMd	12	**19.55**	19.04	20.00	0.256	11	**19.41**	18.93	19.92	0.357	9	**19.03**	18.50	19.49	0.357
ACo	12	**6.89**	6.60	7.30	0.202	11	**6.68**	6.37	6.92	0.193	9	**6.61**	6.37	6.85	0.162
CM$_3$	12	**11.63**	11.41	12.12	0.211	11	**11.55**	11.31	11.87	0.213	9	**11.20**	10.75	11.54	0.273

			Central Europe					Balkans					Iberia		
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	132	**61.61**	55.5	67.0	2.045	95	**61.61**	58.0	66.3	1.830	11	**61.29**	58.3	63.5	1.600
LCr	296	**23.84**	22.25	25.02	0.483	99	**23.86**	22.60	24.95	0.454	19	**23.54**	22.75	24.32	0.409
LCb	291	**22.58**	21.00	23.72	0.473	96	**22.67**	21.52	23.45	0.398	21	**22.31**	21.75	23.01	0.315
LaZ	274	**15.09**	13.62	17.72	0.404	94	**15.42**	14.05	45.30	3.130	16	**14.98**	14.48	15.42	0.281
LaI	308	**5.24**	4.82	5.85	0.160	100	**5.14**	4.75	5.65	0.164	21	**5.31**	5.08	5.58	0.141
LaN	308	**10.12**	9.38	10.65	0.215	100	**10.02**	9.47	10.61	0.231	21	**10.10**	9.68	10.64	0.242
ANc	295	**8.14**	7.45	9.05	0.254	100	**8.15**	7.37	8.92	0.248	20	**8.03**	7.62	8.67	0.238
CC	303	**6.32**	5.52	6.85	0.213	100	**6.22**	5.35	6.55	0.199	19	**6.19**	5.75	6.48	0.159
M^{3}M^3	290	**9.98**	8.55	10.77	0.305	97	**9.86**	8.75	10.38	0.285	21	**9.86**	9.33	10.20	0.246
CM^3	305	**10.00**	9.35	10.52	0.222	100	**10.06**	9.45	10.55	0.224	21	**9.86**	9.53	10.34	0.222
LMd	306	**18.12**	14.78	19.30	0.440	100	**18.13**	17.32	18.87	0.346	21	**17.81**	17.20	18.52	0.315
ACo	307	**6.07**	5.00	6.85	0.231	100	**6.20**	5.50	6.80	0.228	21	**6.00**	5.75	6.43	0.192
CM$_3$	307	**10.74**	9.70	11.35	0.242	100	**10.84**	9.97	11.92	0.284	21	**10.55**	10.27	11.02	0.224

Felten et al. 1977, Koopman 1994, Benda & Horáček 1995a, b, Spitzenberger 1996, Horáček et al. 2000, Güttinger et al. 2001).

The Levantine populations, i. e. those of Palestine, Lebanon, Syria, and Turkish regions of Cilicia and Hatay, are generally considered to belong to *M. m. macrocephalicus* (Harrison & Lewis 1961, Lewis & Harrison 1962, Harrison 1964a, Atallah 1970, 1977, Kumerloeve 1975b, Felten et al. 1977, Corbet 1978, Harrison & Bates 1991, Koopman 1994, Benda & Horáček 1995a, Qumsiyeh 1996, Spitzenberger 1996, Albayrak & Aşan 1998, Mendelssohn & Yom-Tov 1999, Ferguson 2002). These populations oversized the nominotypical subspecies from Europe almost without any overlap in skull dimensions (Fig. 61). According to the comparison of body dimensions (Table 16), the examined samples from Syria (composed of an almost complete available museum material from this country, see the Records and Material examined) belong to this large form, in accordance with the above mentioned authors.

As the taxonomic affiliation of the Levantine populations seems to be clear without any doubts, the situation of Anatolian populations besides those of Cilicia and Hatay (see the review by Benda & Horáček 1998) remains uncertain. However, a proper evaluation of these neighbouring populations might also affect the opinion on the Levantine subspecies. The samples from western, northern, and central Asia Minor have been more or less tentatively assigned to *M. m. macrocephalicus* by Harrison & Lewis (1961) and Strelkov (1972), to *M. m. myotis* by Steiner & Gaisler (1994) and Benda & Horáček (1995a, b), and to an 'intermediate form' between the former two forms by Felten et al. (1977) and Albayrak & Aşan (1998). Our comparison of limited samples from this part of Turkey (including specimens from the Greek Island of Lesbos) conforms to the opinion of the latter authors (see Fig. 61). According to the skull size, Anatolian populations lie in between the larger bats from the Levant, *M. m. macrocephalicus*, and the smaller European form, *M. m. myotis*, and in body dimensions they broadly overlap with both these subspecies.

More authors agree in findings of the increase of body size in *M. myotis* across the eastern Mediterranean or even Anatolia, however they do not concur in its taxonomic interpretation, see above. Nevertheless, our data rather show a uniform intermediate form in Turkey, since the specimens lying on both margins of the variation range of their dimensions come from western, central and eastern Turkey, respectively.

Benda & Horáček (1995b) reported a slight increase in mean values of skull size of *M. myotis* from west to east in the European Mediterranean but a sharp step difference between west and east Turkish samples. West Turkish bats (two individuals) conformed in size with the European ones (= *M. m. myotis*), but the clearly distinct east Turkish samples (composed of seven bats) were referred to *M. m. macrocephalicus*. On the other hand, Spitzenberger (1996) reported a stable increase of the mean values of skull measurements of this species in Turkey from west to east but did not give any affiliation of this population (while she did in case of *M. m. macrocephalicus* in

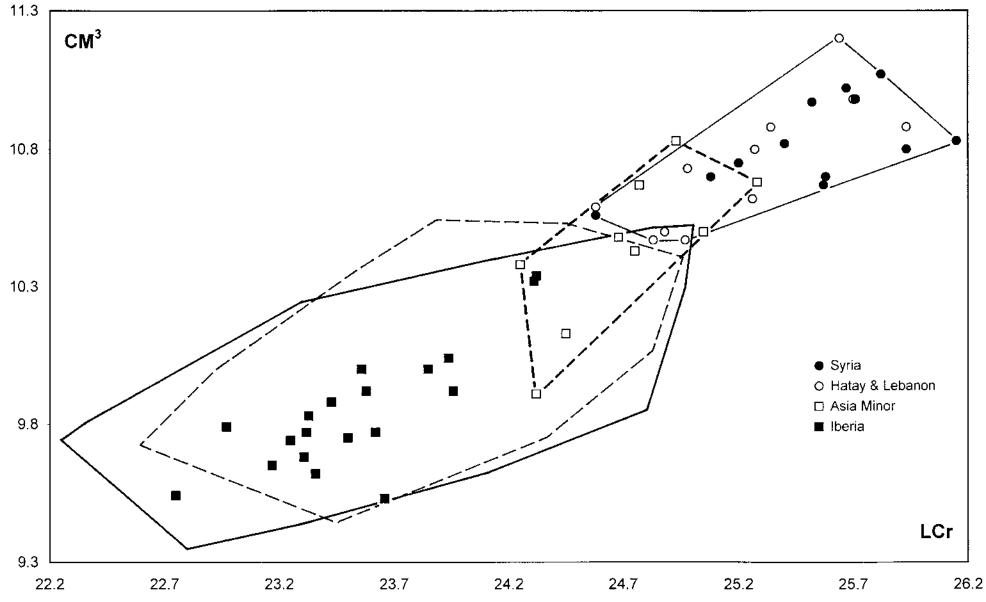


Fig. 61. Bivariate plot of examined Syrian and comparative samples of *Myotis myotis* (Borkhausen, 1797): greatest length of skull (LCr) against the length of upper tooth-row (CM³). Explanation: bold-lined polygon = Central European samples (n=296), i.e. *M. m. myotis*; thin-lined polygon = Levantine samples (n=23), i.e. *M. m. macrocephalicus*; thin-dashed polygon = Balkan samples (n=99); bold-dashed polygon = samples of Asia Minor (n=9).

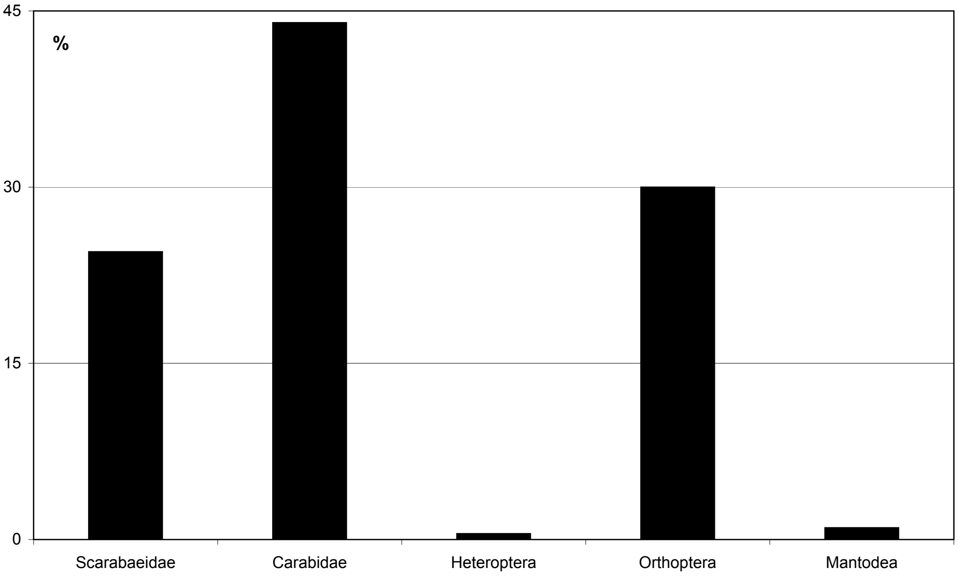


Fig. 62. Volume of particular food items in the diet of *Myotis myotis* (Borkhausen, 1797) from Syria.

the Levant). However, she did not compare Anatolian samples with the nominotypical ones of Europe besides those from Thrace. Therefore, it is not clear from her comparison of the extensive Turkish data whether the 'Anatolian increase' is a geographically isolated phenomenon or a trend observable on a larger geographic scale. Albayrak & Aşan (1998) also found the clinal size increase in Turkish *M. myotis* from west to east, and due to the presence of such intermediate populations between the European and Levantine ones they were rather reluctant to recognise any subspecies in the Middle East. Although their conclusion is not quite clear, they probably consider *M. myotis* monospecific but with clinally shifted size values in individuals of the marginal populations.

It can be concluded from the above summarised findings that, (1) *M. myotis* is continually distributed throughout Anatolia without any remarkable range gap (Benda & Horáček 1998, Albayrak & Aşan 1998), (2) in the mean values of skull dimensions, it increases from west to east without a clear metrical step shift (Spitzenberger 1996, Albayrak & Aşan 1998), although (3) the sample variation ranges are similar both in the west and the east of Turkey (Spitzenberger 1996, Albayrak & Aşan 1998, our data). These conclusions suggest that recognition of a separate subspecies in the Levant (incl. Syria) is rather unjustified and that these populations should be considered only a marginal stage of the continual size increase (although, on the other hand, distributional range of this form cover area of other morphologically clearly defined bat populations).

FEEDING ECOLOGY. *Myotis myotis* is a large species with a ground gleaning and slow hawking foraging strategy (Arlettaz 1996a, Arlettaz et al. 1997b). Carabidae are the most important prey item (Kolb 1958, Bauerová 1978, Gebhard & Hirschi 1985, Beck 1995, Arlettaz 1996a, Garrido 1997, Andreas 2002, etc.) and freshly mowed meadows, lawns in cultivated orchards and/or forest without dense undergrowth seem to be the main foraging habitat in Europe (Audet 1990, Arlettaz 1999, Güttinger et al. 2001).

We collected one faeces sample and two digestive tract contents of *M. myotis* from Syria. We analysed a sample of faeces from Qala'at al Hosn and we found larger Coleoptera to be the most abundant food item (Fig. 62), Carabidae being much more represented than Scarabaeidae. Orthoptera were another important prey category. Two digestive tracts collected at Qala'at al Marqab contained only large Scarabaeidae. Similarly as in the previous studies, our results prove the important role of large representatives of Coleoptera in the diet of *M. myotis*.

PARASITES. Diptera: Nycteribiidae: *Nycteribia latreillii* (Leach, 1817): Baniyas near Mt Hermon (Theodor 1967).

Myotis blythii (Tomes, 1857)

RECORDS. **Original data**: Al Lathiqiyeh: Al Lathiqiyeh [1], 2 fa (specimens in MNHN); – Qala'at Salah ad Din [2], small cave in a gorge under castle ruins, 2 May 2001: 1 ind. from *Strix aluco* pellet. – Dimashq: Jeiroud [3], April–June 1908: 1 fa (MNHN specimen formerly identified as *M. myotis* by Trouessart & Kollmann 1923). – Homs: Qala'at al Hosn [4], ruins of Krak des Chevaliers, 15 July 1997: obs. 22 inds. (coll. 1 ma, 1 ms, 1 fs); 28 June 1998: obs. 5 inds. (coll. 1 ma); 29 May 2001: obs. 17 inds. (coll. 1 ms). – Tartus: Qala'at al Marqab [5], castle ruins, 1 June 2001: coll. 1 ma. – Quneitra / Golan Heights: Qala'at Nimrud [6], 18 July 1999: coll. 1 ma. – **Published data**: Halab: Aleppo (= Halab) [7], 4 July 1914: 1 ma, 7 fa (Spitzenberger 1979, 1996). – Homs: Tell Kalakh, dungeon of Krak des Chevaliers (= Qala'at al Hosn, Krak des Chevaliers) [4], 8 December 1952: 2 m (Harrison & Lewis 1961); Krak de Chevaliers, 23 July 1977: 1 ind. (Nadachowski et al. 1990). – Quneitra / Golan Heights: Camp Faouar [8], June 1976: 1 fa (Spitzenberger 1979, 1996); – Mount Hermon and Golan, two unidentified records mapped in northern part of this region [roughly the areas of Mount Hermon and Mas'adah] (Mendelssohn & Yom-Tov 1999).

DISTRIBUTION. **General**. *Myotis blythii* is a species with the Mediterranean and/or South Palaearctic types of distribution (Corbet 1978, Koopman 1994, Horáček et al. 2000, Topál & Ruedi 2001). It occurs from southern Europe (incl. several Mediterranean islands) over central Europe, Crimea, Transcaucasia, the Near East, and Central Asia to southeastern Iran, the Altai Mts and northern India (Strelkov 1972, Bates & Harrison 1997); possibly also in northern China (Strelkov 1972, Koopman 1994). According to the study by Castella et al. (2000), *M. blythii* is absent from North Africa and some Mediterranean islands where it is replaced by a separate species, *M. punicus* Felten, 1977 (see also Topál & Ruedi 2001).

Near East. *M. blythii* occurs in the Mediterranean parts of the Near East; it has been found commonly in Turkey, the Levant and in the entire Zagros Mts and the Armenian Highlands (DeBlase 1980, Harrison & Bates 1991, Spitzenberger 1996, Benda & Horáček 1998, our data). In the Near East, *M. blythii* reaches the southern margin of its distribution range in Palestine and southern Iran.

In Turkey, *M. blythii* is the second most frequently found bat species, its records have come from all parts of the country (Satunin 1913, Çağlar 1965, 1969, Theodor 1967, DeBlase & Martin 1973, Spitzenberger 1973, 1996, Kock 1974, von Helversen 1989, Albayrak 1990a, 1993a, Nadachowski et al. 1990, Obuch 1994, Steiner & Gaisler 1994, Benda & Horáček 1998, Özgül et al. 2000, Albayrak & Aşan 2001, Karataş et al. 2004, Yiğit et al. 2006, Karataş & Sachanowicz in press, our unpubl. data). This species was repeatedly recorded also in Cilicia and Hatay as well as in rather arid parts of southeastern Anatolia (Çağlar 1965, 1969, Albayrak 1990a, 1993a, Nadachowski et al. 1990, Obuch 1994, Spitzenberger 1996, Benda & Horáček 1998, Karataş et al. 2004, Karataş & Sachanowicz in press; Fig. 63).

In the southern Levant, *M. blythii* has been found at several sites in Lebanon (Harrison & Lewis 1961, Lewis & Harrison 1962, Atallah 1970, Tohmé & Tohmé 1985, our unpubl. data) and several times in Palestine (Harrison 1964a, Makin 1977, Mendelssohn & Yom-Tov 1999, Ferguson 2002); Mendelssohn & Yom-Tov (1999) give six confirmed records of this bat lying to

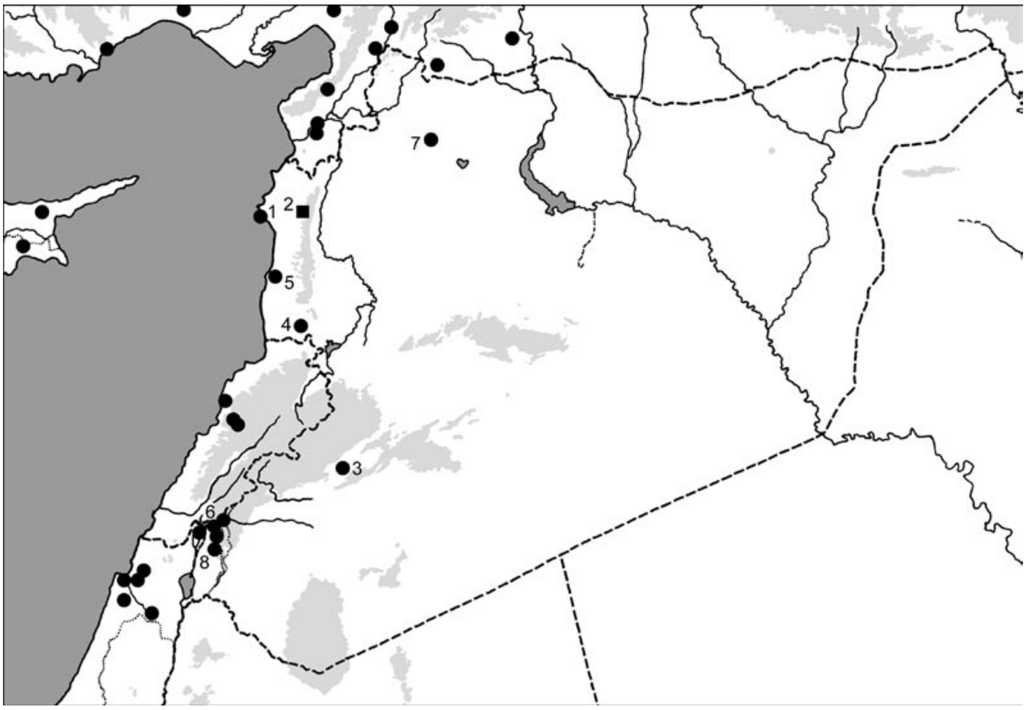


Fig. 63. Records of *Myotis blythii* (Tomes, 1857) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

the north from Samaria. This species has never been recorded in Jordan (Qumsiyeh et al. 1998, Amr 2000, Amr et al. 2004).

In the eastern part of the Near East, *M. blythii* is known from two sites in northern Iraq (Bate 1930, Sanborn 1940) and it seems to be widespread in the entire mountainous parts of western Iran (Dobson 1871, Thomas 1905, Cheesman 1921, Harrison & Lewis 1961, Harrison 1963b, Etemad 1967, Lay 1967, DeBlase 1980, our unpubl. data, etc.).

M. blythii has been several times found in Cyprus (Spitzenberger 1979, Boye et al. 1990, our unpubl. data; cf. Bate 1903, Strelkov 1972).

Syria (Fig. 63). *M. blythii* is a medium-frequent bat in Syria, ten records are known (Table 1). It inhabits the Mediterranean woodland zone of the Levantine coast and the Jebel An Nusariyah Mts [1, 2, 4, 5] (Harrison & Lewis 1961, our data) as well as of the Golan Heights [6, 8] (Mendelssohn & Yom-Tov 1999, our data). Two records come from a more arid zone of the Mediterranean steppe-maquis [3, 7] (Spitzenberger 1979, 1996, our data). All records well connect the distribution in other Levantine countries.

The distributional pattern of *M. blythii* in Syria well resembles that in Turkey – the species tends to prefer more continental conditions than *M. myotis*, and also *M. blythii* has been found to be more common than the latter species (Spitzenberger 1996, Benda & Horáček 1998). In Syria as well as in southeastern Turkey this bat has been found more frequently in arid steppe areas of the margins of Mesopotamia (Fig. 63; Karataş et al. 2004, Karataş & Sachanowicz in press).

FIELD NOTES. Similarly as the previous species, also *Myotis blythii* was recorded only roosting in artificial shelters. Most findings were made in the ruins of Krak des Chevaliers (Qala'at al Hosn; Fig. 8); by previous authors on 8 December 1952 (Harrison & Lewis 1961) and on 23 July 1977 (Nadachowski et al. 1990). We found 22 individuals scattered throughout the castle on 15 July 1997, both in lightened and in dark rooms: in the warehouse, in the pillars room/refectory and in the house in the courtyard under the walls (place nomenclature after Humphreys & Simonis 1999). The observed bats roosted solitarily or in pairs in the hollow tops of vaults or in ceiling and wall fissures; in four cases there was a pair composed of an adult (female) and a juvenile, well identifiable by its smaller size and darker pelage colour. This situation suggested that there was a colony which has just dispersed throughout the castle. On 28 June 1998, five individuals were observed to roost solitarily in the castle, and 17 individuals on 29 May 2001, in a similar position as in 1997. A torpid male was collected in Qala'at Nimrud (Fig. 11), in a ceiling cavity of the Western Gate Tower, and one male was found in the castle ruins of Qala'at al Marqab (Fig. 64).

In Syria, *M. blythii* was found to share its shelters with *R. hipposideros*, *R. ferrumequinum*, *M. schreibersii* and an unidentified medium-sized horseshoe bat (Qala'at al Hosn), with *R. hardwickii* and *R. ferrumequinum* (Qala'at Nimrud) and with *M. myotis*, *M. nattereri* and *E. anatolicus* (Qala'at al Marqab).

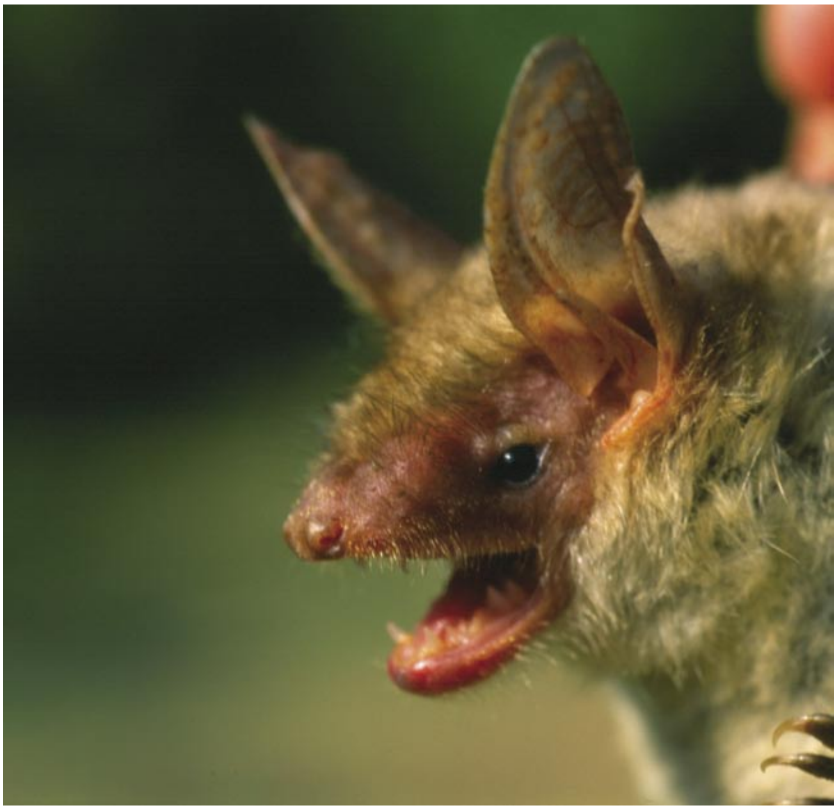


Fig. 64. Portrait of *Myotis blythii* (Tomes, 1857) from Qala'at al Marqab (photo by A. Reiter).

Table 17. Basic biometric data on examined Syrian and comparative samples of *Myotis blythii* (Tomes, 1857). For abbreviations see pp. 10, 11

	Syria					Zagros Mts. (Iran)					Transcaucasia				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	10	**59.74**	57.6	61.9	1.586	25	**60.56**	57.1	66.7	2.004	9	**58.57**	56.0	60.5	1.726
LCr	19	**22.23**	21.47	22.72	0.322	31	**22.38**	21.43	23.20	0.444	15	**22.16**	21.68	22.75	0.351
LCb	18	**21.21**	20.63	21.75	0.338	31	**21.38**	20.48	22.20	0.454	13	**21.09**	20.58	21.78	0.394
LaZ	15	**14.37**	14.02	14.68	0.203	31	**14.36**	13.55	14.83	0.309	13	**14.11**	13.55	14.70	0.284
LaI	19	**5.19**	4.86	5.53	0.184	31	**5.24**	4.93	5.49	0.136	15	**5.21**	4.95	5.37	0.112
LaN	19	**9.90**	9.52	10.25	0.230	32	**9.87**	9.23	10.32	0.227	15	**9.84**	9.47	10.42	0.261
ANc	18	**7.74**	7.47	8.05	0.177	32	**7.79**	7.35	8.22	0.196	15	**7.77**	7.51	8.27	0.220
CC	18	**5.90**	5.65	6.28	0.170	31	**5.92**	5.59	6.35	0.184	14	**5.88**	5.55	6.18	0.218
M^3M^3	19	**9.20**	8.79	9.70	0.207	32	**9.20**	8.78	9.78	0.210	15	**9.23**	8.60	9.56	0.226
CM^3	19	**9.34**	8.98	9.75	0.181	33	**9.33**	8.93	9.75	0.210	15	**9.30**	8.88	9.55	0.208
LMd	19	**17.01**	16.52	17.48	0.259	33	**17.14**	16.58	17.83	0.332	15	**17.02**	16.32	17.50	0.385
ACo	19	**5.51**	5.27	5.87	0.150	33	**5.56**	5.06	5.89	0.240	15	**5.46**	5.02	5.87	0.234
CM_3	19	**9.98**	9.63	10.37	0.217	33	**10.07**	9.63	10.59	0.238	15	**10.02**	9.65	10.27	0.192

	Kopetdag Mts (Iran & Turkmenistan)					Lesbos					Crete				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	43	**59.77**	56.0	63.0	1.941	2	**59.10**	58.2	60.0	1.273	6	**59.67**	56.9	62.2	2.093
LCr	63	**21.97**	20.70	22.76	0.537	7	**21.84**	21.08	22.65	0.508	9	**21.95**	20.70	22.78	0.598
LCb	63	**20.95**	19.53	21.81	0.542	7	**20.78**	20.10	21.44	0.486	9	**20.94**	19.93	21.47	0.513
LaZ	53	**14.00**	12.85	14.83	0.434	7	**14.01**	13.55	14.41	0.333	9	**14.16**	13.72	14.81	0.305
LaI	64	**5.05**	2.07	5.47	0.408	7	**5.07**	4.74	5.39	0.195	9	**5.10**	4.90	5.29	0.129
LaN	64	**9.65**	9.00	10.24	0.264	7	**9.68**	9.52	10.12	0.212	9	**9.75**	9.42	10.07	0.241
ANc	63	**7.56**	6.80	8.07	0.270	7	**7.58**	7.38	7.85	0.156	9	**7.78**	7.32	8.08	0.233
CC	64	**6.76**	5.25	9.76	1.524	6	**5.66**	5.33	5.89	0.185	9	**5.76**	5.33	6.10	0.235
M^3M^3	64	**9.12**	8.20	9.88	0.368	7	**9.01**	8.73	9.48	0.238	9	**8.94**	8.58	9.13	0.165
CM^3	64	**8.29**	5.67	9.93	1.453	7	**9.00**	8.65	9.22	0.188	9	**9.02**	8.58	9.23	0.201
LMd	64	**16.82**	15.67	17.57	0.415	7	**16.67**	15.93	17.12	0.440	9	**16.75**	16.14	17.48	0.428
ACo	64	**5.33**	4.65	5.83	0.273	7	**5.38**	5.08	5.65	0.221	9	**5.39**	5.17	5.77	0.217
CM_3	64	**9.94**	9.53	10.42	0.207	7	**9.60**	9.21	9.82	0.201	9	**9.75**	9.40	9.95	0.197

	Turkey					India, Afghanistan & Tajikistan					Kirghizstan				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	15	**58.18**	56.0	60.5	1.360	5	**57.74**	55.9	61.5	2.405	108	**56.94**	53.2	61.0	1.854
LCr	19	**21.73**	20.17	22.97	0.764	11	**21.03**	20.25	21.57	0.352	106	**21.07**	20.20	22.47	0.394
LCb	19	**20.73**	18.82	21.94	0.820	11	**19.94**	18.98	20.68	0.424	104	**19.95**	10.89	21.32	0.973
LaZ	20	**13.92**	11.80	15.23	0.701	7	**13.67**	13.28	13.96	0.235	93	**13.59**	12.82	14.37	0.333
LaI	20	**5.23**	4.90	5.67	0.170	12	**5.03**	4.82	5.20	0.120	108	**5.04**	4.70	5.42	0.159
LaN	20	**9.73**	8.97	10.40	0.363	10	**9.55**	9.07	9.91	0.217	108	**9.58**	9.12	10.07	0.194
ANc	19	**7.65**	7.13	8.02	0.272	11	**7.45**	7.18	7.74	0.181	103	**7.44**	6.95	7.96	0.199
CC	17	**5.78**	4.97	6.41	0.348	11	**5.70**	5.30	6.02	0.224	108	**5.64**	4.83	6.13	0.223
M^3M^3	20	**8.97**	8.00	9.58	0.371	12	**8.90**	8.67	9.45	0.209	108	**8.85**	8.08	9.98	0.309
CM^3	19	**8.97**	8.05	9.58	0.405	12	**8.75**	8.48	9.32	0.234	108	**8.71**	8.28	9.27	0.196
LMd	19	**16.55**	14.88	17.75	0.727	12	**15.93**	15.42	16.47	0.302	108	**16.03**	15.08	16.97	0.351
ACo	19	**5.37**	4.90	5.70	0.230	12	**5.11**	4.74	5.41	0.165	108	**5.09**	4.67	5.62	0.177
CM_3	19	**9.75**	9.22	10.31	0.341	12	**9.30**	8.22	9.98	0.414	108	**9.46**	9.02	10.92	0.235

Table 17. (continued)

	Central Europe					Balkans					Iberia				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	40	**57.00**	52.5	62.0	2.254	53	**57.99**	51.4	63.6	2.199	2	**59.20**	56.1	62.3	4.384
LCr	103	**21.38**	20.44	22.42	0.452	61	**21.34**	20.35	22.35	0.437	6	**21.39**	20.15	21.97	0.741
LCb	100	**20.29**	19.52	21.78	0.423	58	**20.25**	19.15	21.00	0.413	6	**20.30**	19.22	20.93	0.721
LaZ	80	**13.65**	12.88	14.22	0.312	48	**13.66**	12.87	14.28	0.354	5	**14.09**	13.74	14.36	0.225
LaI	103	**5.12**	4.65	5.62	0.190	63	**5.03**	4.72	5.53	0.159	6	**5.07**	4.92	5.27	0.149
LaN	103	**9.61**	8.88	10.08	0.214	62	**9.61**	9.20	10.22	0.210	6	**9.82**	9.62	10.13	0.208
ANc	101	**7.52**	7.05	8.00	0.209	57	**7.52**	7.10	8.07	0.252	6	**7.63**	7.24	7.92	0.278
CC	98	**5.69**	5.15	6.22	0.165	59	**5.63**	4.85	6.03	0.231	5	**5.59**	5.27	5.75	0.185
M^3M^3	103	**8.87**	8.35	9.92	0.275	62	**8.79**	7.54	9.44	0.323	6	**8.85**	8.68	9.02	0.133
CM^3	100	**8.80**	8.35	9.37	0.206	62	**8.76**	8.06	9.25	0.244	6	**8.87**	8.27	9.21	0.33
LMd	102	**16.21**	15.32	17.72	0.418	64	**16.17**	15.25	17.15	0.381	6	**16.09**	15.07	16.78	0.627
ACo	99	**5.20**	4.67	6.02	0.201	62	**5.12**	4.53	5.92	0.250	6	**5.24**	4.90	5.54	0.219
CM_3	102	**9.47**	8.60	10.02	0.222	64	**9.48**	8.85	9.93	0.199	6	**9.48**	8.93	9.75	0.343

Similarly as in other parts of the Middle East, where *M. blythii* was found in the diet of at least three owl species (Nadachowski et al. 1990, Obuch 1994, Benda & Horáček 1998, Obuch unpubl.), it was detected in owl diet also in Syria. In a small cave in a gorge below the ruined castle of Qala'at Salah ad Din, remains of an individual were found in a *Strix aluco* pellet (representing 0.63% of the whole prey items and 1.0% of the mammalian items of the sample, see Table 35).

Material examined. 1 ma, 7 fa (NMW 22048–22055 [S+A]), Aleppo (= Halab), 4 July 1914, leg. V. Pietschmann, Armenien-Expedition 1914; – 1 fa (NMW 21931 [S]), Camp Faouar, June 1976, leg. P. Schneider & K. Kollnberger; – 1 fa (MNHN 1983-1484 [A]), Djéroud (= Jeiroud), 1908, leg. H. Gadeau de Kerville; – 2 fa (MNHN 1876-335A, 335B [A]), Lattakié (= Al Lathiqiyeh), leg. M. Deyrolle; – 1 ma, 1 ms, 1 fs (NMP 47976–47978 [S+A]), Qala'at al Hosn, 15 July 1997, leg. P. Benda; – 1 ma (NMP 48057 [S+A]), Qala'at al Hosn, 28 June 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 1 ms (NMP 48874 [S+A]), Qala'at al Hosn, 29 May 2001, leg. M. Andreas, A. Reiter & D. Weinfurtová; – 1 ma (NMP 48917 [S+A]), Qala'at al Marqab, 1 June 2001, leg. M. Andreas, A. Reiter & D. Weinfurtová; – 1 ma (NMP 48271 [S+A]), Qala'at Nimrud, 18 July 1999, leg. P. Benda; – 2 ma, 1 fa (BMNH 61.388, 389 [S+B], 61.390 [S]), Tall Kalakh, dungeon of Krak des Chevaliers (= Qala'at al Hosn, ruins of Krak des Chevaliers), 8 December 1952, leg. D. Potter.

Morphology. See Table 17 and Appendix III for biometric data on the Syrian specimens of *Myotis blythii*.

Taxonomy. *Myotis blythii* is considered a polymorphic species (Ellerman & Morrison-Scott 1951, Harrison & Lewis 1961, Topál 1971, Strelkov 1972, 1981, Corbet 1978, Iliopoulou-Georgudaki 1984, Koopman 1994, Benda & Horáček 1995a, b, Topál & Ruedi 2001, Simmons 2005). In accordance with the recent findings (cf. Castella et al. 2000), four to five subspecies are recognised; viz. *M. b. blythii* (Tomes, 1857) (terra typica: 'Nassenabad, India' given by Tomes 1857, but Ellerman & Morrison-Scott 1951 suggested 'Nasirabad, Rajputana, India'; the latter site was regarded incorrect by Topál 1971, who preferred the original locality, but was accepted by Corbet 1978, Corbet & Hill 1992, and Bates & Harrison 1997); *M. b. oxygnathus* (Monticelli, 1885) (t.t.: Matera, Basilicata [S Italy]); *M. b. omari* Thomas, 1905 (t.t.: Derbent, 50 mi. W. of Isfahan [C Iran]); *M. b. ancilla* Thomas, 1910 (t.t.: Shangchow, SE Shensi, China); and *M. b. lesviacus* Iliopoulou, 1984 (t.t.: Mithymna, Lesvos, Greece). Justification of the latter subspecies was doubted by Benda & Horáček (1995a, b), Arlettaz et al. (1997a), Hanák et al. (2001) and Topál & Ruedi (2001), but regarded valid by Koopman (1994), Topál (in Mitchell-Jones et al. 1999), and Simmons (2005). Based on a genetic analysis, the Maghrebian, Corsican, Sardinian and Maltese populations of large mouse-eared bats formerly considered to be a subspecies of *M. blythii* do represent a separate species, *M. punicus* Felten, 1977 (t.t.: Höhle El Haouaria, Cap Bon, Tunesien) (Castella et al. 2000, Topál & Ruedi 2001, Ruedi et al. 2004, Simmons 2005). On the other hand, the European *M. b. oxygnathus* has been regarded a separate species by some authors (Spitzenberger & Bauer 2001, Simmons 2005) in accordance with the preliminary genetic comparisons (Castella et al. 2000, Ruedi & Mayer 2001), however, later results of profound analyses suggest to consider this form rather a part of *M. blythii* (cf. Ruedi et al. 2004, Berthier et al. 2006).

The systematic position of Asian populations currently attributed to *M. blythii* remained indistinct for a long time (see e.g. Thomas 1905, Satunin' 1914, Cheesman 1921, Bobrinskoy 1925, Ognev 1927, 1928, Ogneff & Heptner 1928, Kuzjakin 1934, 1950, Kusjakin 1935, Sanborn 1940, Ellerman & Morrison-Scott 1951, Harrison 1956c, Aellen 1959, Hatt 1959). Harrison & Lewis (1961) were the first who evaluated populations of *M. blythii* of the Middle East including samples from Syria. They found Syrian and Lebanese specimens to be larger in body and skull dimensions than European samples (previously assigned to *M. b. oxygnathus* by Ellerman & Morrison-Scott 1951) but to concur in size with Persian taxa *M. myotis omari* Thomas, 1905 and *M. myotis risorius* Cheesman, 1921 (t.t.: Shiraz, alt. 5,200', Persia [C Iran]). Therefore, they synonymised the latter names with *M. blythii* but as a separate subspecies, *M. b. omari*, which they supposed to occur at least in parts of the Middle East (Iran, Lebanon, Syria).

Although this view has not been accepted generally (see Harrison 1963b, Kuzjakin 1965, Etemad 1967, Hayman & Hill 1971, or Kumerloeve 1975b), it has been confirmed by the large-scale analyses carried out by Topál (1971) and Strelkov (1972). Topál (1971) suggested synonymy of the names *blythii*, *murinoides* Dobson, 1873 (t.t.: Chamba, 3,000 ft., North-Western Himalayas [Himachal Pradesh, India]), *dobsoni* Trouessart, 1879 (nomen novum for *murinoides* Dobson), *oxygnathus*, *omari*, *ancilla*, and *risorius*, under the former name as the senior one. He also validated the opinion given by Harrison & Lewis (1961) on the synonymy of *omari* and *risorius*, with the former name being available for designation of the subspecies occurring in the Middle East. Both morphometric analyses (Topál 1971, Strelkov 1972) outlined details of the geographical variation in *M. blythii*, which was suggested to comprise at least four subspecies; the small sized *M. b. oxygnathus* in continental Europe from Spain to Crimea; the large sized *M. b. omari* in the Caucasus region, Asia Minor, Levant, Iran, W Turkmenistan, large Mediterranean islands and the Maghreb; the small sized *M. b. blythii* in Afghanistan, northern India and Central Asia; and *M. b. ancilla* in northeastern China. This arrangement was almost fully adopted by Felten et al. (1977) who only excluded the populations of southwestern Mediterranean (Maghreb, Sardinia, Corsica, Malta) from the rank of *M. b. omari* and described them as a separate subspecies *M. b. punicus*.

All the above mentioned comparisons as well as the subsequent authors (Atallah 1970, 1977, Corbet 1978, DeBlase 1980, Strelkov 1981, Nadachowski et al. 1990, Harrison & Bates 1991, Koopman 1994, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Ferguson 2002, Simmons 2005) agreed in assignation of the Levantine populations, including the Syrian ones, under the subspecies *M. b. omari*, ranging from Crete and eastern Turkey to the Kopetdag Mts of Iran and Turkmenistan.

Our comparison of skull dimensions (Table 17, Fig. 65) has shown Syrian individuals to be among the largest found within the species. They concur in size with the samples from the Caucasus region, Cyprus and eastern Turkey as well as from the Zagros Mts, Iran, where the forms *omari* and *risorius* were described. These sample sets represent undoubtedly the subspecies *M. b. omari*, which is in accordance with the conclusions given by Harrison & Lewis (1961), Topál (1971), Strelkov (1972), Spitzenberger (1979), and Felten et al. (1977). However, populations found in the regions bordering the area of the *omari* samples, i.e. in the Aegean region and Crete in the west and the Kopetdag Mts in the east, represent size transitions between the larger subspecies of the centre of the Middle East, *omari*, and the smaller forms, *oxygnathus* in Europe and *blythii* in Central Asia.

The intermediate populations of the Kopetdag Mts along the border between Mediterranean habitats of the Iran Plateau and Central Asian deserts were formerly assigned to the form *omari* by Ogneff & Heptner (1928), Kusjakin (1935), Topál (1971), Strelkov (1972), and Strelkov et al. (1978). On the other hand, the intermediate populations of Crete were assigned to *omari* by Strelkov (1972) and Iliopoulou-Georgudaki (1979, 1984), although their transitional position was noted by Lanza (1959b) and inexplicitly also by Topál (1971). The intermediate bats from the Aegean island of Lesbos were described by Iliopoulou-Georgudaki (1984) as a new subspecies, *M. b. lesviacus*. However, in our comparison the latter two samples showed very similar positions (Fig. 65).

Benda & Horáček (1995a, b) found a cline increase in metrical characters from west to east across the Meditteranean as far as Transcaucasia and Iran, with a sharp step shift in Asia Minor that separates the smaller *M. b. oxygnathus* in northwestern Anatolia from *M. b. omari* in eastern Turkey. These data well conform with the results by Felten et al. (1977). Unfortunately, the analysis by Benda & Horáček (1995a, b) did not include central Anatolian samples. However, Spitzenberger (1996) analysed extensive Turkish samples of *M. blythii* and described a similar trend of size increase from west to east in Anatolia as the previous authors did for the whole Mediterranean. Benda & Horáček (1995a, b) also analysed samples from the Kopetdag Mts, the region found to host transition forms, and they did not report any sharp step shift in these bats.

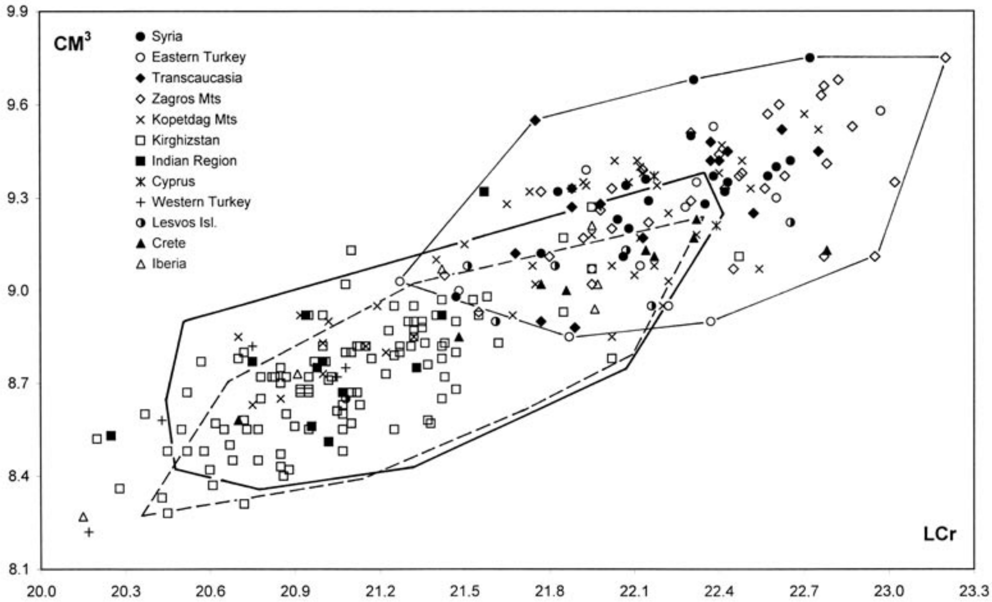


Fig. 65. Bivariate plot of examined Syrian and comparative samples of *Myotis blythii* (Tomes, 1857): greatest length of skull (LCr) against the length of upper tooth-row (CM^3). Explanation: bold-lined polygon = Central European samples (n=100); dashed polygon = Balkan samples (n=61), i.e. *M. b. oxygnathus* (Monticelli, 1885); thin-lined polygon = Middle Eastern samples (from Cyprus and from regions to the east of Cyprus; n=67), i.e. *M. b. omari* Thomas, 1905; Indian Region denotes area of India, Tajikistan and Afghanistan.

To be concluded, *M. blythii* appears to exhibit a considerable morphometric variation, showing a similar pattern in the western part of its distribution range as in *M. myotis* (see above). As described by a number of the above quoted authors, a relatively small form occurs in Europe, a larger form inhabits the Middle East – approximately the area from the Levant to the Caspian region, and another small form lives in Central Asia and northern India. These forms are considered and truly seem to be well defined geographical subspecies. However, there are no gaps in the species range between these three taxonomically designed populations but a continual distribution. Both these transition areas are estimated to be about 1000 km broad and are inhabited by populations of an intermediate size. As they are populations with clinal increase of metric characters and are thus metrically indefinable, they undoubtedly do not deserve any taxonomic delineation (contra Iliopoulou-Georgudaki 1984, Koopman 1994, Simmons 2005).

Feeding ecology. *Myotis blythii* is a large species with a ground gleaning and slow hawking foraging strategy (Arlettaz 1996a, Arlettaz et al. 1997b, Güttinger et al. 1998). The diet of this species was studied in the Swiss Alps, where Orthoptera (Tettigoniidae), Lepidoptera larvae and seasonally Scarabaeidae (*Melolontha melolontha*) were the most important prey categories (Arlettaz 1996a). Rahmatulina (2005) found seasonal variation in the diet composition of *M. blythii* in Azerbaijan: Coleoptera were found to be a dominant part of the diet in summer compared to Lepidoptera and Trichoptera in autumn; Diptera were a numerous item in both seasons. Orthoptera (Gryllidae) were reported to be the most important food item in western Iran and the other recorded items were Scarabaeidae, Chilopoda, Mantodea and Heteroptera (Benda et al. 1999b).

From Syria, we analysed three digestive tracts of bats collected at Qala'at al Hosn in July 1997 and recorded the following volumes of particular food items: Mantodea (50%), Orthoptera (45%) and Araneae (5%). One analysed digestive tract, collected at Qala'at al Marqab, contained 100% of Orthoptera. These results correspond well with previous studies and indicate that Orthoptera are one of the most important prey categories in *M. blythii*.

Myotis nattereri (Kuhl, 1817)

Records. **Original data**: Al Lathiqiyeh: Qala'at Salah ad Din [1], castle ruins, 13 October 2004: coll. 3 fa. – Der'a: Talsh'hab [2], waterfall in the Al Yarmuk Valley, 25 May 2001: net. 1 ma; – Dimashq: Sarghaya [3], gardens, 28 May 2001: net. 1 ma; – Yabroud [4], cave in an escarpment above the town, 26 June 1998: net. 3 ma; – Tartus: Qala'at al Marqab [5], castle ruins, 1 June 2001: obs. colony at least of 15 inds. ad.+juv. (coll. 1 ma, 1 fa, 2 faL, 2 fj). – **Published data**: Mount Hermon, a record mapped (Mendelssohn & Yom-Tov 1999).

Distribution. **General**. *Myotis nattereri* is a species with West Palaearctic type of distribution (Horáček & Hanák 1984, Koopman 1994, Horáček et al. 2000, Topál 2001b). It occurs from the Maghreb, the British Islands, western Europe and southern Scandinavia, over central Europe, the European Mediterranean (incl. some islands) and eastern Europe, to the Caucasus region, the Near East and southwestern Turkmenistan (Horáček & Hanák 1984, Topál 2001b).

Near East. According to the records known, *M. nattereri* inhabits two separated regions in the Near East (Harrison & Bates 1991, Benda & Horáček 1998, cf. DeBlase 1980); one region is represented by a broad belt of Mediterranean coastal areas in southern Turkey and the Levant, the other one includes mountains of eastern Turkey, northern Iraq and Transcaucasia. Persian records of *M. nattereri* mentioned by DeBlase (1980) have shown to be of *M. schaubi* Kormos, 1934 (Horáček & Hanák 1984). In the Near East (Palestine) as well as in the Maghreb, *M. nattereri* reaches southern margins of its whole distribution range.

Most records of *M. nattereri* in Turkey come from the southern coastal areas (Kock 1974, Horáček & Hanák 1984, von Helversen 1989, Albayrak 1993a, b, Aktaş & Hasbenli 1994, Spitzenberger 1994, Hasbenli 1997, Benda & Horáček 1998, Karataş & Sachanowicz in press), and only three records have been made in the eastern part of the country (von Helversen 1989, Obuch 1994, Benda & Horáček 1998; but see below). Only one finding of this bat is known from Lebanon, from Mogharet Saleh near Amchite (Atallah 1970).

In Palestine, *M. nattereri* occurs in the Mediterranean areas of the country (Yom-Tov & Kadmon 1998), including the Judean Hills, Coastal Plains and the Galilee (Theodor 1954a, Theodor & Moscona 1954, Bodenheimer 1958, Harrison 1964a, b, Makin 1977, 1987, Mendelssohn & Yom-Tov 1999), some of its records, however, have come also from the Hula Valley (Theodor 1967, Makin 1977, Mendelssohn & Yom-Tov 1999). The only Jordan record of this species was mentioned by Qumsiyeh (1980) from the Dibbine NP, Ajloun Mts in the northwestern corner of the country.

Rzebik-Kowalska et al. (1978) published the only Iraqi record of *M. nattereri*, from the Gali Ali Beg waterfall, northern Iraq. Several records of this bat have been reported from Cyprus (Boye et al. 1990, our unpubl. data).

Syria (Fig. 66). *M. nattereri* is a rather rare bat in Syria, only six records are available (Table 1). In Syria, it was previously known only from the Golan Heights (Mendelssohn & Yom-Tov 1999). From Syria *proper*, this species is here mentioned for the first time. *M. nattereri* inhabits the Mediterranean woodland zone only, such as in the neighbouring regions, although some findings come from rather drier areas [2, 4]. Syrian records of this bat connect its relatively abundant findings

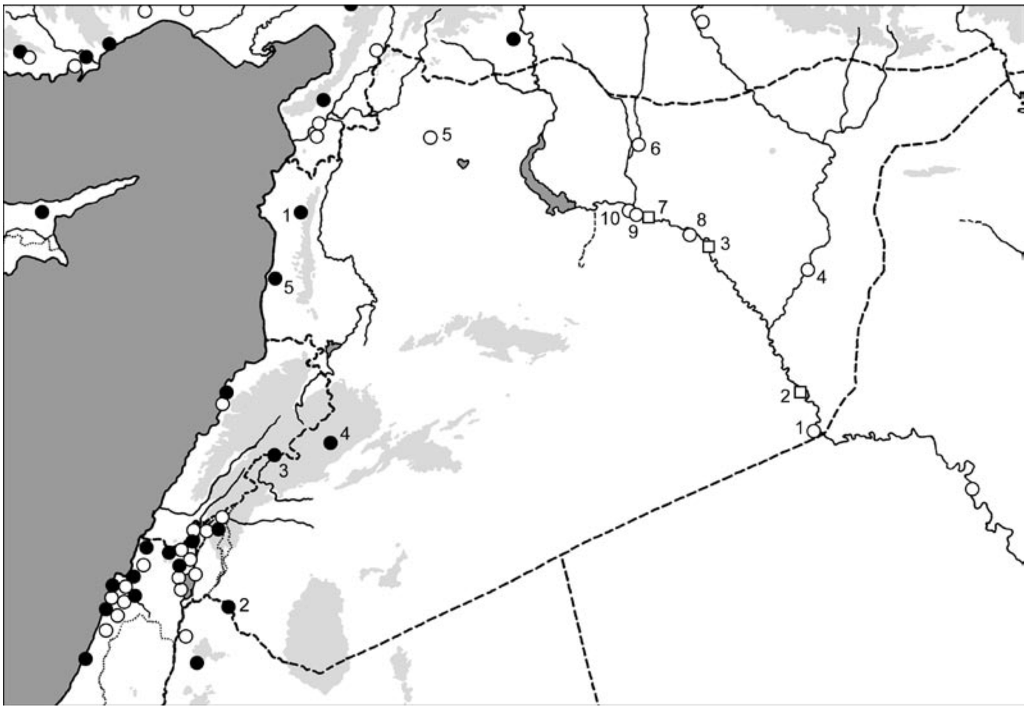


Fig. 66. Records of *Myotis nattereri* (Kuhl, 1817) (closed symbols) and *M. capaccinii* (Bonaparte, 1837) (open symbols) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

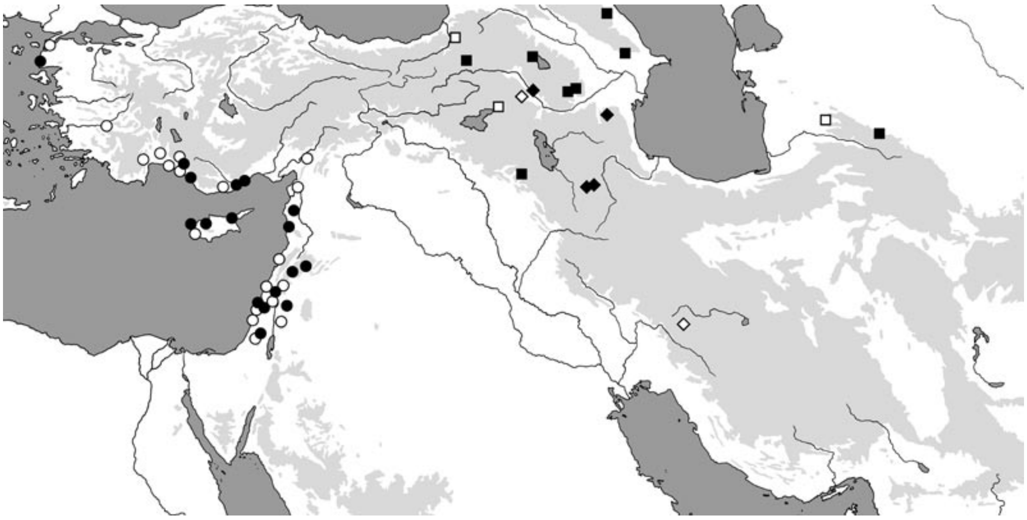


Fig. 67. Records of bats of the *Myotis nattereri* group in the Near East. Explanation: full symbols – sites of revised material origin, open symbols – sites of non-revised material origin, circles – *M. nattereri* (Kuhl, 1817), diamonds – *M. schaubi* Kormos, 1934, squares – *M. tschuliensis* Kusjakin, 1935.

in Palestine and the Turkish Levantine area of distribution. At present, the records of *M. nattereri* are scattered throughout the northeastern Mediterranean from Greece to central Palestine without any notable interruption (Figs. 66, 67; see also Hanák et al. 2001, Benda & Horáček 1998), which can be seen e.g. in the data by Harrison & Bates (1991) or Horáček et al. (2000).

FIELD NOTES. The roosts of *Myotis nattereri* in Syria were found in artificial shelters situated in historical castles. Three adult females were found roosting individually in ceiling fissures in a vaulted room (stables) in the ruins of Qala'at Salah ad Din (Fig. 40). A colony of at least 15 individuals, including the examined sample of two lactating females and two juvenile females fully grown and volant (LAt 41.2 and 41.8 mm), was discovered on 1 June 2001 in an abandoned building in the northern part of the castle ruins of Qala'at al Marqab (Fig. 68). The stage of development of the young conformed with the findings by Mendelssohn & Yom-Tov (1999) who reported sucklings in Palestine to occur in early April and early May and post-partum females at the end of April, suggesting the period of births during March–May (but Atallah 1977 and Qumsiyeh 1996 estimated this term at late May or early June). Similarly, Harrison (1964a) found a colony in Palestine on 30 April, with pregnant females containing relatively large foeti (crown-rump length 13.8–20.5 mm). Aşan Baydemir & Albayrak (2006) found pregnant females in Turkish Hatay in May.

M. nattereri shared the sites with *R. hipposideros*, *R. ferrumequinum*, *R. euryale*, and *M. emarginatus* (Qala'at Salah ad Din) and with *M. myotis*, *M. blythii* and *E. anatolicus* (Qala'at al Marqab), although none of these species was observed to share a roost with *M. nattereri*.

In Syria, *M. nattereri* was recorded by netting three times; an adult male was caught into a mist--net installed above a small lake below a waterfall at Talsh'hab in the Al Yarmuk Valley (Fig. 6). Another male was netted above the Yahfufa river at Sarghaya, in the centre of a valley covered with gardens and orchards. Three adult males were netted at the opening of a large cave/overhang in cliffs above the oasis of Yabroud (Fig. 37). Other species foraging at the same sites, recorded during the netting sessions, were *R. aegyptiacus*, *P. kuhlii* and *M. schreibersii* (plus *T. teniotis* calls) at Talsh'hab, *P. pipistrellus* at Sarghaya, and *P. macrobullaris* and *H. savii* (plus *T. teniotis* calls) at Yabroud.

In the Middle East, *M. nattereri* was found in owl diet in Turkey (Obuch 1994), however, no similar data are available from Syria.

MATERIAL EXAMINED. 1 ma, 3 fa, 2 fj (NMP 48910, 48911 [S+A], 48912 [S+B], 48909, 48913, 48914 [A]), Qala'at al Marqab, 1 June 2001, leg. M. Andreas, A. Reiter & D. Weinfurtová; – 3 fa (NMP 90284–90286 [S+A]), Qala'at Salah ad Din, 13 October 2004, leg. R. Lučan; – 1 ma (NMP 48870 [S+A]), Sarghaya, 28 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma (NMP 48860 [S+A]), Talsh'hab, 25 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 3 ma (NMP 48049–48051 [S+A]), Yabroud, 26 June 1998, leg. M. Andreas, P. Benda & M. Uhrin.

MORPHOLOGY. See Table 18 and Appendix III for biometric data on the Syrian specimens of *Myotis nattereri*.

TAXONOMY. According to the last published revision of the *M. nattereri* group (Horáček & Hanák 1984), *Myotis nattereri* is a rather unvariable species in which two subspecies are recognised, viz. *M. n. nattereri* Kuhl, 1817 (terra typica: Laacher See [Rhineland-Palatinate, Germany] according to Kuhl 1817, 1818; unjustifiably restricted to 'Hanau, Hessen, Germany' by Miller 1912) and *M. n. tschuliensis* Kusjakin, 1935 (t.t.: Čuli, Kopet-Dag [Turkmenistan]). Although the previous authors (Ognev 1927, 1928, Dal' 1947, Ryberg 1947, Kuzjakin 1950, 1965, Ellerman & Morrison-Scott 1951, Strelkov 1963, 1981, Corbet 1978) considered *M. nattereri* polytypic and broadly

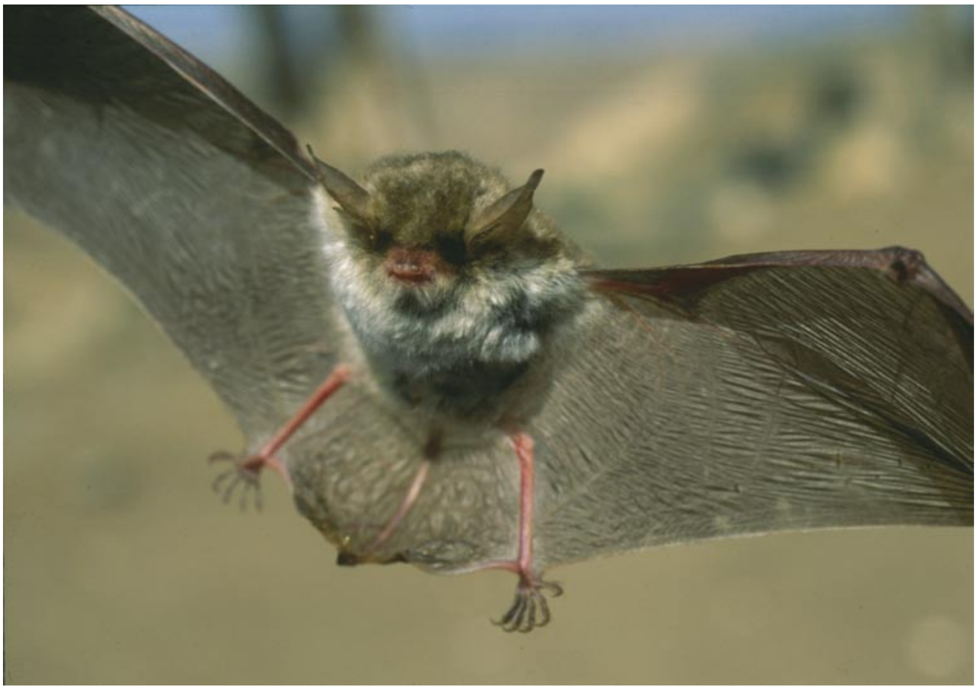


Fig. 68. Portrait of *Myotis nattereri* (Kuhl, 1817) from Qala'at al Marqab (photo by A. Reiter).

distributed in the Palaearctic, the arrangement by Horáček & Hanák (1984) was mostly accepted by subsequent authors (see Pavlinov & Rossolimo 1987, 1998, Koopman 1993, 1994, Borisenko & Pavlinov 1995, Horáček et al. 2000, Topál 2001b, Simmons 2005). The other originally described subspecies of *M. nattereri* (i.e., *bombinus*, *amurensis*, and *araxenus*) are considered to be separate species or their subspecies (see Horáček & Hanák 1984).

The populations of *M. nattereri* from the Near East were formerly assigned to three or four forms. Harrison (1963b) mentioned a record of *M. n. araxenus* Dal', 1947 (t.t.: near Amagy, Vajkskij range, Araxes basin [Armenia]) from northwestern Iran. Harrison (1964b) described a new subspecies from Palestine, *M. n. hoveli* Harrison, 1964 (t.t.: Aqua Bella, near Jerusalem, Israel). Rzebik-Kowalska et al. (1978) reported on a capture of series of *M. nattereri* from Qali Ali Beg, northern Iraq, that was close in size to *M. n. tschuliensis* from the Kopetdag Mts, Turkmenistan, but they hesitated to attribute their sample to this form. Finally, Horáček & Hanák (1984) recognised this series as of *M. n. tschuliensis* indeed. These authors also reported *M. n. nattereri* in western Turkey, however, they considered *M. n. hoveli* to be a junior synonym of the nominotypical form (see below). On the other hand, Albayrak (1993b) regarded Turkish populations to belong to *M. n. hoveli*. Benda & Horáček (1995b, 1998) reported from the 'most of the territory of Turkey' *M. n. nattereri*.

The Palestinian subspecies *M. n. hoveli* was differentiated from *M. n. nattereri* from Central Europe on the basis of two main characters; the paler coloration of dorsal pelage and more elevated frontal region of the skull (Harrison 1964a, b). The possible exclusive position of the Levantine populations of *M. nattereri* was accepted by some other authors (Atallah 1970, 1977, Qumsiyeh 1980, Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999). However, Atallah (1970, 1977) found the Lebanese samples of *M. nattereri* much darker than the type series of *hoveli* and assigned these populations to the Palestinian form only "on the geographical grounds". Horáček & Hanák (1984) found type series of *M. n. hoveli* to be close to the Balkan samples of *M. n. nattereri* both in skull morphology and coloration. Consequently, they stated that "*hoveli* does not exceed the variation range of the nominate form […], *hoveli* is to be denoted as subspecies whose validity is doubtfull". Although Qumsiyeh (1980) reported the form *M. n. hoveli* from Jordan, later he accepted the results by Horáček & Hanák (1984) and mentioned *M. n. nattereri* from Jordan or even from the Holy Land (Qumsiyeh et al. 1992, Qumsiyeh 1996): "the subspecies *hoveli* is considered here a synonym of *Myotis nattereri nattereri* because the characters used to distinguish it (e.g. lighter colour) are clinally variable".

As reviewed by Harrison & Bates (1991), Koopman (1994), Benda & Horáček (1998), Horáček et al. (2000) and Topál (2001b), and as noticed above, three morphotypes of *M. nattereri* group have been reported from the Near East. The small form inhabits most of Anatolia and the Levant, and has been referred to *M. n. nattereri* or *M. n. hoveli*, see above; the medium-sized form occurs in northern Iraq and the Caucasus region and was coidentified with *M. n. tschuliensis*. The large form is known from northwestern Iran and Armenia; this form, which is suggested to live in sympatry with the previous form and was formerly designed as the subspecies *M. n. araxenus*, has been regarded a separate species *M. schaubi* Kormos, 1934 (t.t.: Villány 3, Hungary, Late Pliocene), of which the named form *araxenus* represents the only extant subspecies (Horáček & Hanák 1984, Ruedi & Mayer 2001, Topál 2001b), while others (*schaubi*, *kretzoii*) are known only from fossil evidence.

However, as the phylogenetic analysis by Jones et al. (2006) has shown, the medium-sized Caucasian form constitutes a sister taxon to the larger sympatric form, *M. schaubi araxenus*; these two forms belong to a clade which is a parallel to the clade containing European *M. nattereri*. Apparently, all these three forms which meet in the Near East (Fig. 67) could represent separate species, *M. nattereri*, *M. tschuliensis*, and *M. schaubi*.

Table 18. Basic biometric data on examined Syrian and comparative samples of *Myotis nattereri* (Kuhl, 1817) and on other Middle Eastern taxa of the *M. nattereri* group. For abbreviations see pp. 10, 11

								M. nattereri							
			Syria					Palestine					Mediterranean Turkey & Cyprus		
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	14	**40.44**	38.5	42.0	1.038	0	–	–	–	–	33	**40.27**	37.6	42.9	1.220
LCr	9	**15.84**	15.16	16.42	0.350	7	**15.92**	15.23	16.29	0.400	32	**15.92**	15.39	16.60	0.282
LCb	10	**14.71**	14.15	15.08	0.256	8	**14.78**	14.05	15.20	0.380	31	**14.83**	14.19	15.39	0.268
LaZ	8	**9.99**	9.72	10.33	0.198	5	**10.10**	9.70	10.37	0.279	29	**9.95**	9.58	10.31	0.187
LaI	11	**3.58**	3.44	3.74	0.114	8	**3.73**	3.58	3.90	0.103	32	**3.61**	3.35	3.84	0.113
LaN	11	**7.79**	7.66	7.97	0.099	8	**7.93**	7.73	8.10	0.131	32	**7.76**	7.43	8.12	0.171
ANc	9	**5.59**	5.32	5.92	0.186	7	**5.82**	5.50	6.10	0.183	32	**5.64**	5.38	5.87	0.126
CC	11	**3.99**	3.54	4.23	0.201	7	**4.20**	4.00	4.35	0.128	32	**4.03**	3.63	4.25	0.124
M^3M^3	11	**6.22**	5.88	6.48	0.185	7	**6.34**	6.00	6.50	0.174	32	**6.29**	5.75	6.57	0.179
CM^3	11	**6.11**	5.82	6.41	0.149	8	**6.17**	5.88	6.32	0.151	32	**6.13**	5.86	6.37	0.144
LMd	11	**11.40**	11.08	11.74	0.189	8	**11.58**	11.05	12.00	0.320	32	**11.48**	11.13	11.82	0.199
ACo	11	**3.40**	3.03	3.62	0.204	2	**3.30**	3.20	3.40	0.141	29	**3.419**	3.170	3.700	0.133
CM_3	11	**6.55**	6.32	6.84	0.146	8	**6.55**	6.25	6.71	0.186	32	**6.500**	6.160	6.720	0.141

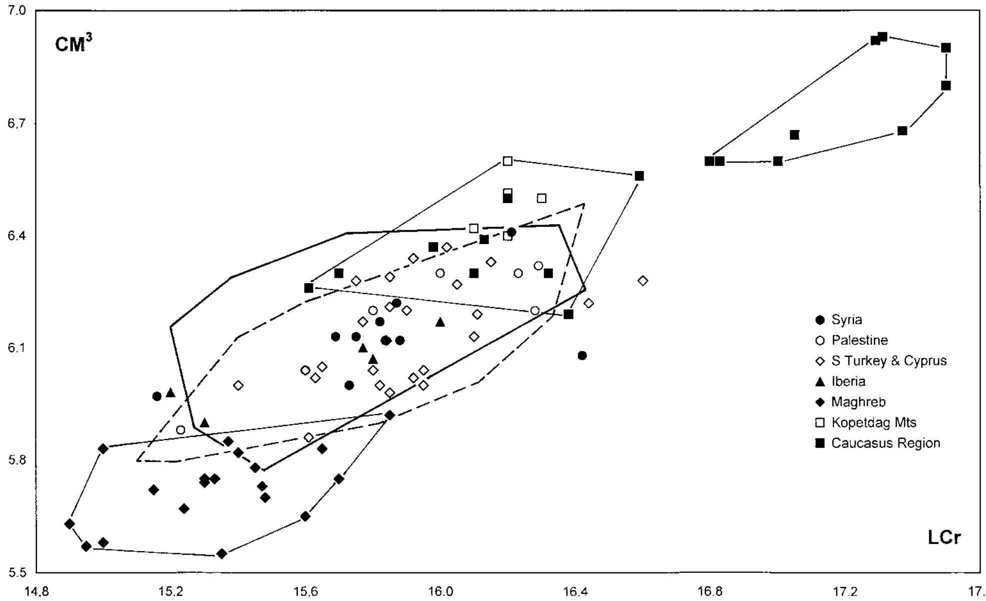
								M. nattereri							
			Central Europe					Balkans					Maghreb		
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	0	–	–	–	–	32	**40.15**	37.6	42.8	1.137	0	–	–	–	–
LCr	51	**15.75**	15.10	16.45	0.309	49	**15.76**	15.20	16.43	0.318	19	**15.34**	14.90	15.85	0.262
LCb	47	**14.69**	14.08	15.27	0.301	47	**14.69**	14.25	15.22	0.270	19	**14.24**	13.80	14.58	0.249
LaZ	51	**9.86**	9.10	10.70	0.342	41	**10.01**	9.40	10.50	0.276	19	**9.48**	9.15	9.82	0.188
LaI	63	**3.88**	3.63	4.45	0.139	49	**3.77**	3.26	4.13	0.152	19	**3.59**	3.40	3.72	0.093
LaN	61	**7.93**	7.50	8.38	0.159	50	**7.87**	7.23	8.35	0.210	19	**7.68**	7.37	7.87	0.125
ANc	59	**5.66**	5.20	6.15	0.178	50	**5.65**	5.34	6.15	0.163	19	**5.77**	5.45	6.78	0.274
CC	65	**4.04**	3.52	4.42	0.140	48	**4.06**	3.83	4.30	0.112	19	**3.85**	3.72	4.05	0.101
M^3M^3	65	**6.50**	6.00	7.00	0.196	49	**6.46**	5.47	6.82	0.222	19	**6.14**	5.80	6.38	0.155
CM^3	66	**6.12**	5.80	6.50	0.147	50	**6.14**	5.77	6.42	0.158	19	**5.73**	5.55	5.92	0.101
LMd	66	**11.50**	10.75	12.25	0.285	50	**11.45**	10.80	12.00	0.266	19	**11.00**	10.60	11.70	0.272
ACo	23	**3.33**	3.02	3.60	0.122	31	**3.31**	2.85	3.60	0.185	18	**3.30**	3.00	3.58	0.118
CM_3	65	**6.50**	6.20	6.84	0.163	52	**6.52**	6.05	6.83	0.176	19	**6.13**	5.88	6.35	0.113

			M. tschuliensis					*M. tschuliensis*					*M. schaubi araxenus*		
			Kopetdag Mts					Armenian Hglds					Armenian Hglds		
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	0	–	–	–	–	7	**41.39**	40.8	42.2	0.543	4	**43.05**	42.2	44.1	0.904
LCr	5	**16.20**	16.10	16.30	0.071	10	**16.09**	15.61	16.59	0.308	9	**17.18**	16.80	17.50	0.270
LCb	5	**15.11**	14.95	15.30	0.143	9	**15.15**	14.68	15.57	0.268	9	**16.11**	15.67	16.50	0.250
LaZ	3	**9.87**	9.80	10.00	0.115	3	**10.43**	10.10	11.02	0.512	7	**10.69**	10.27	10.90	0.282
LaI	5	**3.70**	3.70	3.70	0.000	10	**3.68**	3.47	4.00	0.175	9	**4.08**	3.82	4.40	0.187
LaN	5	**7.87**	7.77	8.00	0.092	9	**7.88**	7.62	8.31	0.253	9	**8.47**	7.98	9.00	0.294
ANc	1	**5.56**	–	–	–	8	**5.75**	5.27	6.28	0.302	5	**6.17**	6.04	6.40	0.13
CC	1	**3.93**	–	–	–	7	**4.12**	3.98	4.45	0.154	5	**4.49**	4.27	4.70	0.155
M^3M^3	1	**6.41**	–	–	–	7	**6.56**	6.33	6.92	0.192	5	**7.12**	6.99	7.25	0.103
CM^3	5	**6.49**	6.40	6.60	0.080	9	**6.35**	6.19	6.56	0.117	9	**6.74**	6.60	6.93	0.141
LMd	5	**11.80**	11.70	11.90	0.071	9	**11.81**	11.60	12.08	0.188	9	**12.55**	12.23	12.90	0.230
ACo	0	–	–	–	–	6	**3.50**	3.32	3.73	0.168	4	**3.84**	3.77	3.88	0.050
CM_3	5	**6.84**	6.80	6.90	0.052	9	**6.74**	6.60	6.95	0.097	9	**7.18**	6.90	7.37	0.149

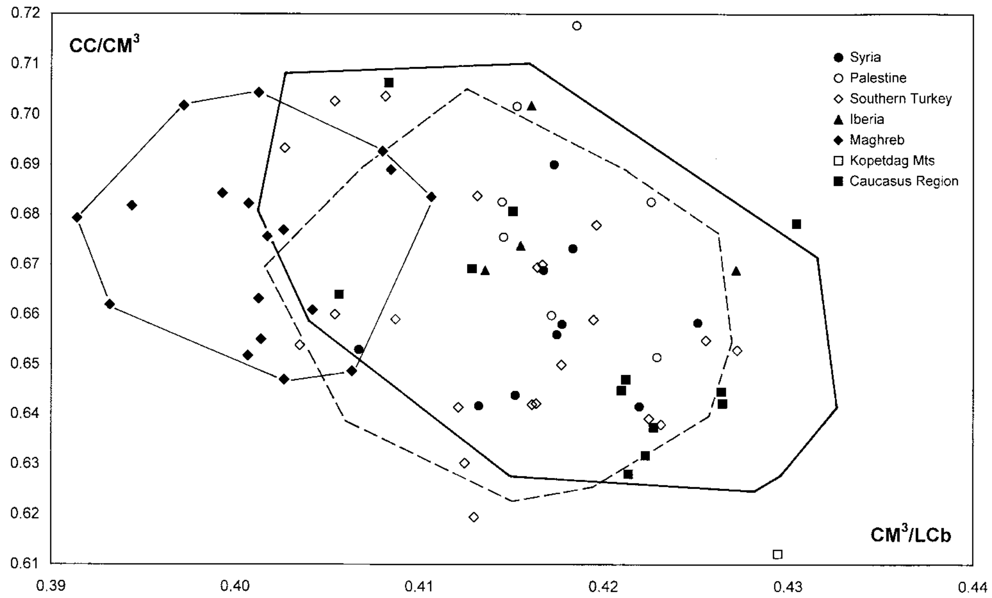
Syrian individuals of *M. nattereri* fit by their external and skull dimensions in the variation range of the nominotypical subspecies from Central Europe and the Balkans (Table 18, Figs. 69, 70), similarly as other Levantine samples (W and SW Turkey, Cyprus, Palestine). The size of upper incisors, which was found by Horáček & Hanák (1984) to be wider in the Palestinian populations, is in Syrian bats similar to the state in Central European, Balkan, Turkish and Cypriot samples (Fig. 71).

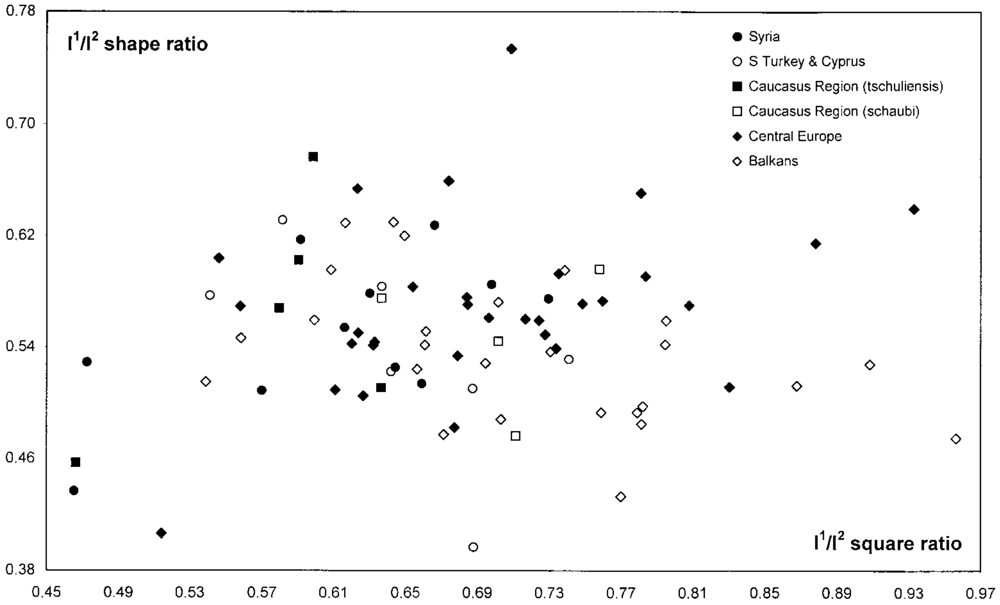
However, there is a partial overlap in skull dimensions of *M. nattereri* with those of *M. tschuliensis*, and occurrence of *M. tschuliensis* in Syria is possible regarding its known distribution range and the dimensions of Syrian bats. Nevertheless, we consider all Syrian individuals in our sample to belong to *M. nattereri* because all of them were found in the Mediterranean part of the country, in conditions similar to those in other parts of its range. *M. tschuliensis* has been hitherto recorded only in continental steppes and semi-arid areas of the Near East and the Caucasus region (see Fig. 67), thus, its occurrence is likely in northeastern parts of the country.

The pelage coloration of the examined Syrian specimens of *M. nattereri* was most frequently brown or rusty brown, exceptionally pale brown, but always without the typical greyish tinge which is common in European populations (Figs. 68, 72). The colour variation in Syrian samples is similar as in the close areas of Palestine (Harrison 1964a, b, Horáček & Hanák 1984) but unlike in Lebanon, where, however, only four individuals have been examined (Atallah 1970). Ears and tragi of Syrian specimens are pale and almost unpigmented. Our data confirmed the statement by Horáček & Hanák (1984), that the coloration traits vary throughout the Mediterranean popu-



Figs. 69. Bivariate plot of examined Syrian and comparative samples of *Myotis nattereri* group: greatest length of skull (LCr) against the length of upper tooth-row (CM^3). Explanation: dashed polygon = Central European samples, i.e. *M. n. nattereri* (n=51); bold-lined polygon = Balkan samples (n=49); for geographic origin of samples denoted by the thin-lined polygons see the legend on the right side of the figure. Caucasus Region denotes the areas of eastern Turkey, northwestern Iran, Transcaucasia, and the Caucasus Mts.





Figs. 70, 71. Bivariate plots of examined Syrian and comparative samples of *Myotis nattereri* group. 70 (above) – relative length of the rostrum (CM³/LCb) against the relative width of the rostrum (CC/CM³) ratio. For explanation see Fig. 69. 71 (below) – I¹/I² square ratio (ratio of squares of the first and second incisor crowns) against the I¹/I² shape ratio (ratio of width/length ratios of the first and second incisor crowns).

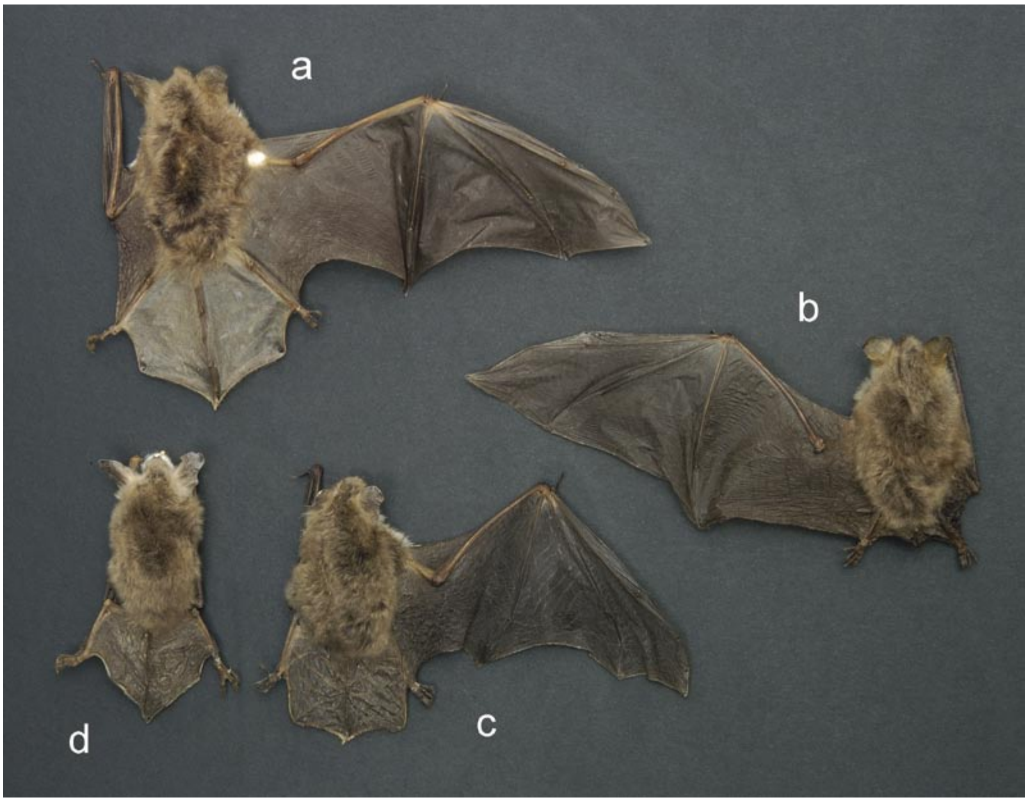


Fig. 72. Pelage coloration in the *Myotis nattereri* group: *M. nattereri* (Kuhl, 1817): a – female, NMP 48912, Syria, Qala'at al Marqab, b – female, NMP 153/65, Czech Republic, Smržov, c – male, NMP 48581, Greece, Pappigo; *M. tschuliensis* Kusjakin, 1935: d – female, NMP 91304, Azerbaijan, Şemaxa, Mt. Kys-Kalasy.

lations of *M. nattereri*. Most probably, they do not have such taxonomic importance as Harrison (1964b) suggested.

In conclusion, as the dimensional characters of Syrian samples were found to be on average very similar to those of all other examined samples of *M. nattereri* (with the exception of the Maghrebian ones, see below) and the coloration traits are rather variable, we consider Syrian population of *M. nattereri* to belong to the nominotypical subspecies similarly as Qumsiyeh (1996) did.

The comparison of skull dimensions also showed an exclusive position of the Maghrebian samples of *M. nattereri* (Fig. 70, Table 18). Individuals from these populations (here from Algeria) have smaller skulls and a different skull shape than the specimens from the rest of the species distribution range. The rostral part of the skull is relatively broader and shorter in Maghrebian specimens than in the nominotypical ones as well as in *M. tschuliensis* and *M. schaubi*. In the latter two species, these characters are in similar states as in *M. nattereri* from Europe and the Levant (*M. n. nattereri*). The simple metrical comparison demonstrated that the Maghrebian populations of *M. nattereri* could belong to a separate taxon. This fact was already mentioned by Horáček & Hanák (1984), Kowalski & Rzebik-Kowalska (1991), and Horáček et al. (2000). Since the limited Iberian samples show similar values of the compared measurements as the nominotypical populations (Figs. 70, 71), the name *Myotis Escalerai* Cabrera, 1904 (t.t.: Foyos, Valencia, Spain, and Bellver, Lérida, Spain*) seems obviously not available for designation of the Maghrebian populations. Therefore, *M. nattereri* populations from northwestern Africa pertain to an undescribed taxon as Horáček et al. (2000) pointed out.

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* Note. The terra typica of the name *Myotis Escalerai* Cabrera, 1904, was not stated to only one site in the description. Cabrera (1904) designated to this name two specimens from two Spanish sites, Foyos, Valencia, and Bellver, Lérida [Catalonia]. Miller (1912) restricted the terra typica to Bellver, while Ellerman & Morrison-Scott (1951) to Foyos (this view was folowed e.g. by Harrison 1964a). Here, we prefer the restriction of the terra typica to Foyos which has been mentioned by Cabrera (1904) on the first place. Moreover, probably only the respective specimen from Foyos was deposited in a collection (Museo de ciencias naturales de Madrid), see Cabrera (1912), and represents/represented the only available type. This fact may also support such restriction.

FEEDING ECOLOGY. *Myotis nattereri* is a medium-sized bat species reported to use mainly foliage gleaning and ground gleaning hunting strategies (Arlettaz 1996b, Swift 1997), feeding especially on the following prey – Diptera, Araneae, Coleoptera, Trichoptera, Lepidoptera and Dermaptera (Bauerová & Červený 1986, Gregor & Bauerová 1987, Beck 1991, 1995, Shiel et al. 1991, Taake 1992, Swift 1997, Andreas 2002). Results of diet analyses showed high regional and seasonal variation, proved an important role of gleaning, but also revealed the ability of this species to hunt swarming small Nematocera and Trichoptera in the open air. The only available data regarding diet composition of this species in the Middle East are based on the analysis of two faecal pellets from Palestine that contained Heteroptera, Coleoptera, Araneae and Diptera (Whitaker et al. 1994).

We analysed three diet samples of *M. nattereri* from Syria; five pellets from Talsh'hab, five pellets from the Qala'at Salah ad Din castle and contents of six digestive tracts from the Qala'at al Marqab castle (Fig. 73). The analysis showed high proportion of prey categories typical for

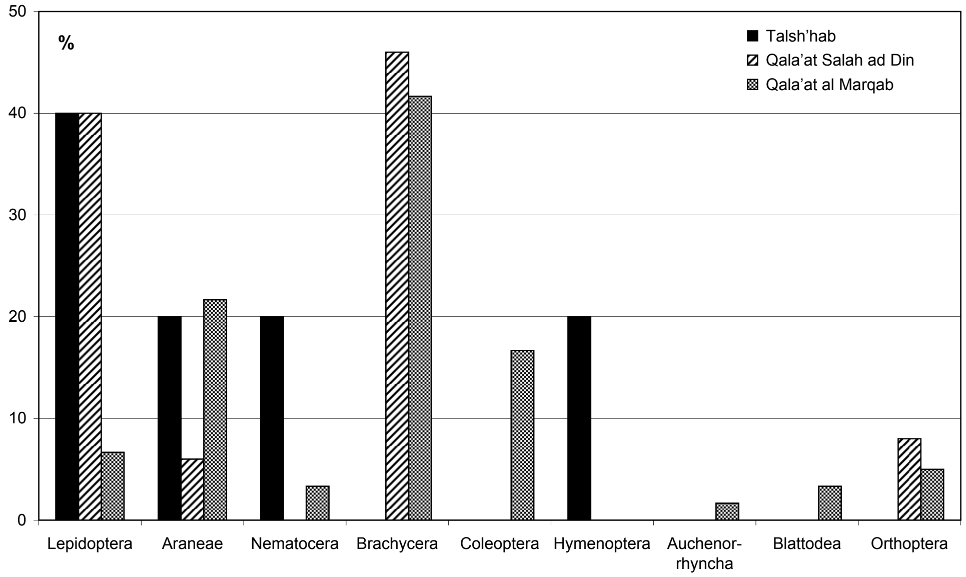

Fig. 73. Volume of particular food items in the diet of *Myotis nattereri* (Kuhl, 1817) from Syria.

gleaners (Araneae, Brachycera), but Nematocera, the diet item taken especially by aerial hawkers, is also present. The most striking difference between our data and previous studies is a very high proportion of Lepidoptera in our samples collected at Talsh'hab and Qala'at Salah ad Din. Thus, our results indicate an important role of gleaning in the foraging behaviour of *M. nattereri* together with the ability of hunting Nematocera in a free space.

Myotis emarginatus (Geoffroy, 1806)

RECORDS. **Original data**: Al Lathiqiyeh: Qala'at Salah ad Din [1], castle ruins, 13 October 2004: obs. signs and remains of a large colony; – Ar Rawda near Rabi'ah [2], forest, 2 July 1998: 1 ind. from *Strix aluco* pellet; – Ras al Bassit [3], 18 May 1995: net. 1 fa (cf. Benda 1996). – Halab: Qala'at Samaan [4], Byzantine ruins, 3 June 2001: obs. colony of ca. 40 adult inds. (coll. 6 faG, 2 fs). – **Published data**: Quneitra / Golan Heights: Mount Hermon, a record mapped [see Material examined] (Mendelssohn & Yom-Tov 1999).

DISTRIBUTION. **General**. *Myotis emarginatus* is a species with mostly a Mediterranean type of distribution (Corbet 1978, Koopman 1994, Horáček et al. 2000, Topál 2001a). It occurs from the Maghreb, Portugal and the Netherlands, over central Europe, the European Mediterranean (incl. some islands), Crimea, Transcaucasia, and the Near East to southeastern Kazakhstan, southern Kirghizstan, Tajikistan, Afghanistan and eastern Oman (Harrison 1977, Rybin et al. 1989, Habilov 1992, Horáček et al. 2000). However, it almost reaches the Afro-tropical region from the Levant along the Rift Valley over western Saudi Arabia to Yemen (Gaucher 1995, Al-Jumaily 2003).

Near East. Like the previous species, *M. emarginatus* occurs in two distinct areas of the Near East. It inhabits western and southern parts of Asia Minor and the Levant (Benda 1996, Mendelssohn & Yom-Tov 1999, Karataş & Özgül 2003, our data). The other area of *M. emarginatus* occurrence in the Near East is the region of Iran (DeBlase 1980, our unpubl. data) and Transcaucasia (Kuzjakin 1965, Rakhmatulina 1995).

In Turkey, the distribution of *M. emarginatus* continues in the Mediterranean regions of western and southern parts of the country along sea coast and in the Euphrates Valley (Doria 1887, Çağlar 1965, von Helversen 1989, Albayrak 1990a, 1993a, Aktaş & Hasbenli 1994, Obuch 1994, Benda & Horáček 1998, Özgül et al. 2000, Karataş & Özgül 2003, Yiğit et al. 2006, Karataş & Sachanowicz in press); only one record comes from northern Anatolia (Albayrak 1990a), in the northeastern regions of the country the species has not been found yet.

In Lebanon, *M. emarginatus* was first mentioned by Tristram (1884), from tombs behind Tyre (= Sour). Lewis & Harrison (1962) published a record from near Amchite, but Atallah (1970) reported the re-identification the reference specimen as of *M. capaccinii*. A third record is possibly represented by the BMNH specimen coming from 'Jebal, Palestine' published by Harrison (1964a). Kumerloeve (1975b) considered this record as 'Jebail, Lebanon' (= Jbail or Byblos) but Harrison & Bates (1991) did not accept this opinion and placed it somewhere in Jordan. Benda (1996) suggested that there might have been an incorrect entry of the Arabic word 'jebel' or 'jabal' which should mean a mount or mountains placed anywhere in the southern Levant where the Reverend Henri Baker Tristram collected. Tohmé & Tohmé (1985) did not mention *M. emarginatus* from Lebanon at all, while Harrison & Bates (1991) and Benda (1996) showed Tristram's (1884) record only from that country.

In Palestine, *M. emarginatus* has been recorded most frequently in the Coastal Plains and on Mount Carmel (Tristram 1884, Harrison 1964a, Makin 1977, 1987, Makin & Mendelssohn 1985, Qumsiyeh 1996, Benda 1996, Mendelssohn & Yom-Tov 1999, Ferguson 2002), some records come, however, from the eastern Galilee and northern Jordan Valley (Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999). The only Jordan record of this bat has been reported by Qumsiyeh et al. (1986) from the Dibbine NP, Ajloun Mts.

A few scattered findings of *M. emarginatus* have been recorded in western Iran, mostly in relatively humid habitats of the Zagros Mts or the Caspian Plain (Etemad 1967, 1969, Lay 1967, DeBlase 1980, our unpubl. data). Niazi (1976) mentioned a record of this species in the 'mid-west part of the country', nevertheless, subsequent authors did not accept this record (Harrison & Bates 1991). Two record sites of this bat are known from Cyprus (Heller et al. 2001, our unpubl. data).

Syria (Fig. 74). *M. emarginatus* is a rather rare bat in Syria, only five records are known (Table 1). It has been recorded in two areas of the Mediterranean woodland zone of Syria, separated by a gap of approximately 270 km along the Levantine shore without any confirmed record. Four records of the species [1–4] come from the northwestern region of Syria (our data), which is an area adjacent to Turkish Hatay, where numerous records are available (Albayrak 1990a, Benda 1996, Karataş & Özgül 2003). Another site of occurrence is Mount Hermon [5] in southwestern Syria (Mendelssohn & Yom-Tov 1999), where it connects distribution in the Galilee and southern Lebanon.

Most probably, the apparent discontinuity in occurrence of *M. emarginatus* along the Levantine shore between Al Lathiqiyeh in northern Syria and Sour in southern Lebanon is caused by a lack of data due to insufficient research effort. Supposedly this species should be found by a more intensive research carried out along the entire Mediterranean Levant, as it has been shown by von Helversen (1989) and Karataş & Özgül (2003) for its Turkish part. Although *M. emarginatus* has been reported to occur in the Euphrates Valley in Turkey (Albayrak 1990a, Obuch 1994), we

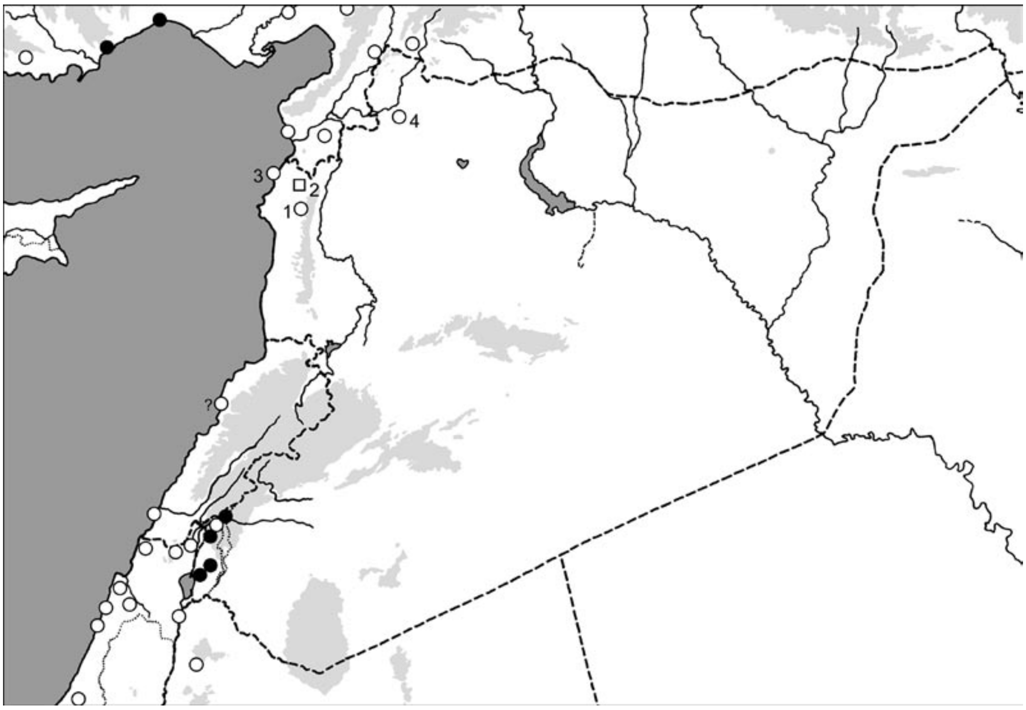

Fig. 74. Records of *Myotis emarginatus* (Geoffroy, 1806) (open symbols) and *Myotis aurascens* Kusjakin, 1935 (closed symbols) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

consider its presence in Syrian part of the Valley as well as in other arid regions almost unlikely, albeit the Niazi's (1975) mention of a possible record from Iraq would suggest so.

Field notes. The only roost where living individuals of *Myotis emarginatus* were recorded, was a dark dungeon in a basement space in ruins of the Byzantine castle of Qala'at Samaan (Fig. 75). A colony of ca. 40 adult individuals – mostly pregnant females – was observed there on 3 June 2001 (Fig. 76; in an adjacent room a colony of *R. ferrumequinum* was found). Each of the six collected pregnant females contained one foetus, whose crown-rump length varied from 17.0 to 22.5 mm (mean 20.1 mm). In the ruined castle baths of the Qala'at Salah ad Din (Fig. 40), a pile of cadavers of adult and juvenile individuals was found (at least 25 individuals, out of which 16 adult specimens were collected) on 13 October 2004. Other species were noticed in these castle ruins, namely *R. ferrumequinum*, *R. hipposideros*, *R. euryale*, and *M. nattereri*, but in their different underground spaces.

Only one individual of *M. emarginatus* was netted in Syria; it was caught under a bridge in an almost dry river valley above a pool of residual water at Ras al Bassit on 18 May 1995 (cf. Benda 1996). It was an adult female without any signs of pregnancy, although two days later in the adjacent Turkish province of Hatay a colony of ca. 25 females was found, out of which 11 were collected and 10 found in various stages of pregnancy. It was visible as a swollen uterus only or as developed foeti with the crown-rump length varying from 10.0 to 11.3 mm (Benda 1996, Benda & Horáček 1998).

According to the present data and those by Harrison (1964a), DeBlase (1980), Mendellsohn & Yom-Tov (1999), and Aşan Baydemir & Albayrak (2006), the births in the Middle Eastern populations of *M. emarginatus* probably occur from the end of May to mid-June.

M. emarginatus was an exceptional item in owl diet in Syria, similarly as in Turkey (Obuch 1994). Remains of one individual were found in a small sample of *Strix aluco* pellets from a pine forest at Ar Rawda. This only individual represented 1.69% of mammalian and 1.49% of all prey items in the respective sample.

Material examined. 1 fa, 1 ind. (TAU M.8427, M.9440 [S+B]), Mount Hermon, 27 April 1988, leg. A. Erez, 20 June 1995, leg. D. Makin & B. Shalmon; – 16 inds. (NMP 90326–90341 [S]), Qala'at Salah ad Din, 13 October 2004, leg. R. Lučan; – 6 fa, 2 fs (NMP 48939–48946 [S+A]), Qala'at Samaan, 3 June 2001, M. Andreas, A. Reiter & D. Weinfurtová; – 1 fa (NMP 47927 [S+A]), Ras al Bassit, 18 May 1995, leg. P. Benda.

Morphology. See Table 19 and Appendix III for biometric data on the Syrian specimens of *Myotis emarginatus*.

Taxonomy. *Myotis emaginatus* is considered to be a polytypic species, up to four subspecies are recognised (Ellerman & Morrison-Scott 1951, Corbet 1978, Koopman 1994, Horáček et al. 2000, Topál 2001a, Simmons 2005); viz. *M. e. emarginatus* (Geoffroy, 1806) (terra typica: Charlemont, Givet, Ardennes, France); *M. e. desertorum* (Dobson, 1875) (t.t.: Jálk, Balúchistán [Iran]); *M. e. turcomanicus* Bobrinskoy, 1925 (t.t.: Moorghab [= Murgab] Valley, Turkmen-Kala, Western Turkestan [Turkmenistan]); *M. e. kuzyakini* Rossolimo et Pavlinov, 1979 [= *M. e. saturatus* Kuzjakin, 1934 nec *M. yumanensis saturatus* Miller, 1897, see Rossolimo & Pavlinov 1979] (t.t.: Tashkent [Uzbekistan] according to Kuzjakin 1934). However, the intraspecific geographical variation in *M. emarginatus* has not been analysed yet, all the above opinions occurred are based on the comparison of colour morphs or on an insufficient number of individuals (see Topál 2001a).

Existence of at least two forms has been mentioned from the Middle East. In the western part of this region, in Asia Minor and in the Levant, only the nominotypical subspecies has been reported to occur (Bodenheimer 1958, Harrison 1964a, Atallah 1977, Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999, Ferguson 2002, Karataş & Özgül 2003).

Opinions on the subspecific variation within the easternmost part of the species range, including the eastern part of the Middle East and Transcaucasia, are more complicated. In the region of Central Asia and Iran, four subspecies have been described (*desertorum*, *lanaceus*, *turcomanicus*, *kuzyakini*). The name *Myotis lanaceus* Thomas, 1920 (t.t.: Shastun, Dizak, Baluchistan [Iran]) is broadly considered to be a junior synonym of the name *Vespertilio desertorum* Dobson, 1875 as they were described from the sites within a distance of only 50 km and their coloration and size are very similar (Ognev 1928, Ellerman & Morrison-Scott 1951, DeBlase 1980). The form *desertorum* was primarily considered to be a separate species present from eastern Transcaucasia to Central Asia and Persia (Dobson 1878, Satunin 1896, 1914, Bianki 1917).

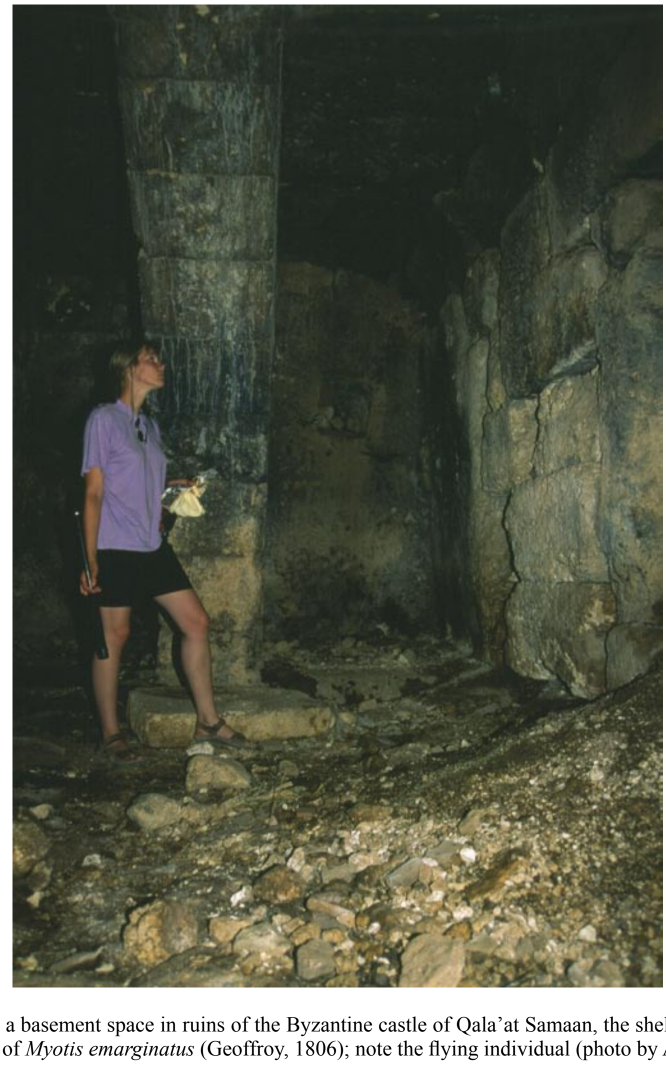

Fig. 75. Dungeon in a basement space in ruins of the Byzantine castle of Qala'at Samaan, the shelter of a colony of ca. 40 adult individuals of *Myotis emarginatus* (Geoffroy, 1806); note the flying individual (photo by A. Reiter).

Bobrinskoy (1925) and Ognev (1927) regarded the Central Asian populations to belong to another form, *M. e. turcomanicus*, differing from the nominotypical and Persian forms by ear morphology and pelage coloration. Very early, Ogneff & Heptner (1928) and Ognev (1928) synonymised the latter name with *M. e. desertorum*, which they considered to occur in Central Asia. Besides that, they recognised only the nominotypical subspecies in the species range (Crimea, Transcaucasia, Europe, North Africa). However, Kuzjakin (1934) and Kusjakin (1935) defined a third subspecies in eastern part of Central Asia, *M. e. saturatus* [= *M. e. kuzyakini*], being darker than other Asian forms, while he regarded the form *turcomanicus* to be a synonym of *M. e. desertorum*.

Ellerman & Morrison-Scott (1951) mentioned all three Asian forms among valid subspecies, *desertorum*, *turcomanicus* and *saturatus* [= *kuzyakini*], besides the nominotypical one. However, Strelkov (1963) recognised only two subspecies in the former USSR, the darker *M. e. emarginatus* (Europe, Caucasus region) and the paler *M. e. desertorum* (Central Asia). Since the latter one is the prior synonym in the non-European part of the complex, Strelkov's (1963) distinction applies to the whole species range.

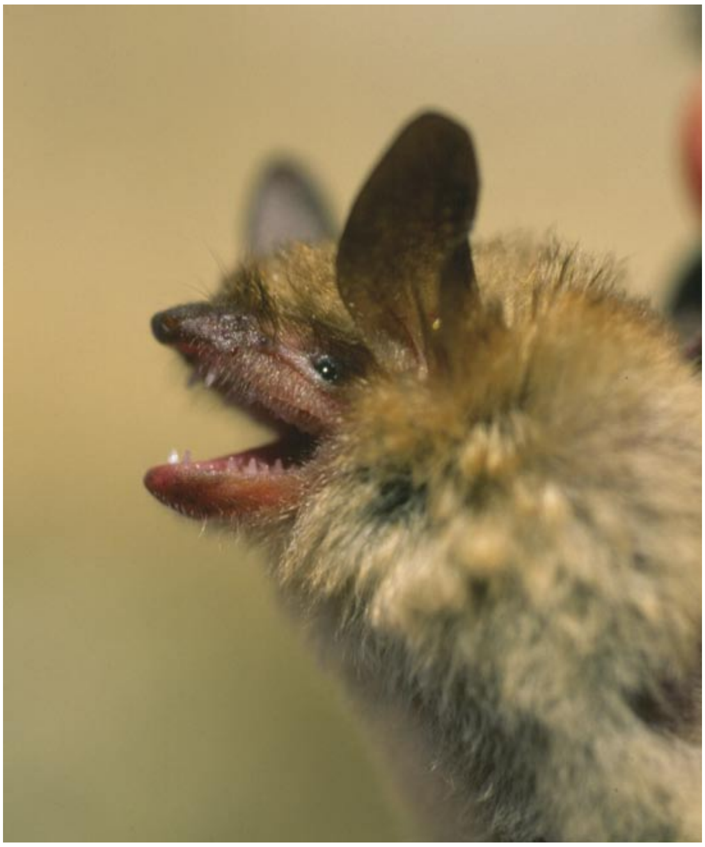

Fig. 76. Portrait of *Myotis emarginatus* (Geoffroy, 1806) from Qala'at Samaan (photo by A. Reiter).

Kuzjakin (1965), Corbet (1978) and Strelkov (1981) presented a three subspecies concept in the species which comprises *M. e. emarginatus* (relatively dark and small; Europe, North Africa, Crimea, Transcaucasia), *M. e. desertorum* (relatively pale and small; deserts of Iran, southern Turkmenistan), *M. e. saturatus* [= *kuzyakini*] (relatively dark and large; Uzbekistan, Tajikistan). Meyer-Oehme (1965) and Gaisler (1971) regarded the Afghani populations to belong to a different subspecies than the nominotypical one, however they did not select an appropriate name.

Strelkov et al. (1978) evaluated the samples of *M. emarginatus* from Turkmenistan; they found only minute coloration differences which they considered hardly substantial for a taxonomic distinction. However, if these differences are taken into consideration, they would indicated existence of two forms for which the following names are available; *M. e. desertorum* (more conspicuous rusty-red tinge) in southern Turkmenistan (the Kopetdag Mts and the Murgab Valley; extralimitally also in the Caucasus) and *M. e. saturatus* [= *kuzyakini*] (paler, greyish tinge is prevailing) in eastern Turkmenistan (the Kugitangtau Mts; also in the Crimea and eastern Uzbekistan). DeBlase (1980) determined two to three colour forms in Iran which he co-identified with subspecies; he restricted the form *desertorum* to southeastern Iran only; in southwestern, western and northern Iran he found *M. e. emarginatus*. DeBlase (1980) detected a possible third form at one site on the Caspian shore (Babol) that showed "very red pelage, with hairs of both the dorsum and ventrum conspicuously tipped with brick-red". Harrison & Bates (1991) assigned Omani populations of *M. emarginatus* to the form *desertorum*. Koopman (1994) summarised taxonomy of the species as four subspecies, *M. e. emarginatus*, *M. e. desertorum*, *M. e. turcomanicus*, and *M. e. saturatus* [= *kuzyakini*]. This division was adopted also by Horáček et al. (2000). Simmons (2005) recognised three subspecies only, i.e. the above species content without *kuzyakini*.

The message of the above reviewed opinions could be summarised as follows; the authors who evaluated larger series of *M. emarginatus* from different types of habitats (e.g. Strelkov et al. 1978, DeBlase 1980, Butovskij et al. 1985), found a mosaic of coloration morphs. These morphs are most probably connected with humidity of the habitat, as a rule, but individual variation may also play a role in the variation. Paler individuals occur in lowland semi-arid regions of Central Asia and Iran, while individuals found in the Mediterranean arboreal and similar habitats of Asia are mainly darker reddish- or orange-brown. Therefore, in the western part of the species distribution range (North Africa, Mediterranean and sub-Mediterranean regions of Europe, the Levant), only one basic coloration morph has been described. Moreover, the coloration of Syrian individuals of *M. emarginatus* does not differ markedly from other Mediterranean samples.

Thus, we consider the pelage coloration as a varying character which is adaptive to habitat and can not have a direct reflection in the species taxonomy. However, the metrical analysis of skull dimensions showed certain trends in the geographic variation. A mere comparison of skull measurements (Table 19) shows the size differences reported by previous authors (e.g. Kuzjakin 1965); the individuals of eastern populations (Caucasus, Central Asia, Iran, Afghanistan) are larger than the Mediterranean bats (incl. the European samples). This fact could indicate a cline shift of size characters, which has been described in other *Myotis* species in the Mediterranean; *M. myotis* and/or *M. blythii* bats being the smallest in the western part of this region (Iberia, Italy) and the largest in the Levant (Benda & Horáček 1995b, see also above). However, the size of the Levantine individuals of *M. emarginatus* lies within a similar variation range as the Balkan or Maghrebian samples, and is on average smaller than the Caucasian, Central Asian or Persian ones. Thus, if the real cline shift in size is present, it has a different geographical appearance than in the two above mentioned species.

The principal component analysis of skull measurements and two skull ratios (Fig. 77; PC1=49.27%; PC2=14.98% of variance) clustered three groups of *M. emarginatus* populations (mostly along the PC1, i.e. according to the skull size); (1) group of smaller individuals (cf.

Table 19. Basic biometric data on examined Syrian and comparative samples of *Myotis emarginatus* (Geoffroy, 1806). For abbreviations see pp. 10, 11

	Syria					Palestine					Hatay & Cyprus				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	9	**40.22**	38.7	41.8	0.869	11	**40.34**	38.0	42.6	1.201	21	**39.22**	37.0	42.1	1.301
LCr	25	**15.63**	15.07	16.08	0.285	13	**15.84**	15.25	16.35	0.379	17	**15.67**	15.27	16.42	0.313
LCb	25	**14.75**	14.18	15.15	0.261	13	**14.93**	14.48	15.47	0.317	17	**14.74**	14.37	15.37	0.254
LaZ	22	**9.67**	9.33	9.97	0.154	12	**9.64**	9.43	9.85	0.151	16	**9.61**	9.24	10.02	0.225
LaI	25	**3.56**	3.29	3.69	0.096	13	**3.51**	3.42	3.65	0.070	17	**3.57**	3.43	3.79	0.105
LaN	24	**7.29**	7.03	7.58	0.129	13	**7.36**	7.12	7.72	0.163	17	**7.27**	6.79	7.52	0.171
ANc	24	**5.67**	5.50	5.88	0.100	13	**5.69**	5.47	6.03	0.184	17	**5.67**	5.44	5.90	0.141
CC	24	**3.96**	3.79	4.17	0.094	12	**3.99**	3.80	4.22	0.125	17	**4.01**	3.83	4.48	0.165
M^{3}M^3	25	**6.17**	5.92	6.36	0.114	13	**6.26**	6.02	6.43	0.124	17	**6.09**	5.91	6.33	0.123
CM^3	25	**6.36**	5.95	6.62	0.191	13	**6.44**	6.25	6.68	0.133	17	**6.37**	6.24	6.54	0.084
LMd	25	**11.68**	11.28	11.98	0.219	13	**11.80**	11.33	12.20	0.295	17	**11.56**	11.26	12.15	0.229
ACo	25	**3.51**	3.34	3.70	0.102	13	**3.51**	3.32	3.75	0.119	17	**3.48**	3.32	3.69	0.110
CM$_3$	25	**6.79**	6.46	7.17	0.157	13	**6.91**	6.67	7.18	0.175	17	**6.76**	6.62	7.09	0.120
CC/CM^3	24	**0.622**	0.582	0.658	0.020	12	**0.622**	0.573	0.656	0.026	17	**0.629**	0.604	0.716	0.026
CM^3/LCb	25	**0.431**	0.404	0.445	0.009	13	**0.431**	0.422	0.439	0.005	17	**0.432**	0.426	0.438	0.004

	Maghreb					Western & Central Europe					Balkans				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	9	**40.34**	38.6	42.6	1.482	67	**39.04**	35.5	41.4	1.395	116	**40.10**	36.0	45.0	1.338
LCr	15	**15.78**	15.12	16.47	0.349	90	**15.58**	14.58	16.45	0.325	103	**15.73**	14.91	16.60	0.362
LCb	15	**14.83**	14.17	15.57	0.323	89	**14.65**	13.75	15.38	0.321	102	**14.92**	14.07	15.95	0.375
LaZ	15	**9.88**	9.57	10.18	0.194	80	**9.65**	8.72	10.20	0.258	94	**9.73**	9.20	10.25	0.240
LaI	15	**3.58**	3.45	3.73	0.077	90	**3.54**	3.23	3.85	0.124	109	**3.55**	3.35	3.90	0.113
LaN	15	**7.42**	7.20	7.60	0.127	91	**7.18**	3.27	7.67	0.717	108	**7.36**	7.03	7.75	0.141
ANc	15	**5.87**	5.58	6.14	0.142	91	**5.77**	5.37	6.17	0.166	102	**5.75**	5.38	6.05	0.155
CC	15	**4.03**	3.81	4.22	0.127	88	**3.93**	3.35	4.25	0.167	105	**4.00**	3.53	4.35	0.152
M^{3}M^3	15	**6.23**	5.83	6.47	0.176	90	**6.09**	5.60	6.48	0.170	109	**6.16**	5.62	6.87	0.192
CM^3	15	**6.32**	5.93	6.54	0.157	90	**6.22**	5.70	6.62	0.160	109	**6.36**	5.88	6.75	0.161
LMd	15	**11.65**	11.17	12.15	0.266	90	**11.49**	10.78	12.02	0.251	105	**11.72**	10.83	12.52	0.322
ACo	15	**3.45**	3.18	3.57	0.110	89	**3.37**	2.92	3.60	0.126	104	**3.49**	3.11	3.80	0.130
CM$_3$	15	**6.74**	6.44	6.97	0.145	90	**6.65**	6.12	7.22	0.175	105	**6.76**	5.93	7.17	0.199
CC/CM^3	15	**0.637**	0.605	0.663	0.018	88	**0.632**	0.540	0.698	0.025	105	**0.629**	0.572	0.671	0.018
CM^3/LCb	15	**0.426**	0.409	0.433	0.007	88	**0.425**	0.408	0.442	0.006	102	**0.426**	0.411	0.440	0.005

PC1≤1.0) is created by samples from western and central Europe, incl. the northern Balkans (Iberia, France, Italy, Switzerland, Austria, Croatia, Serbia) while (2) the group of larger bats (cf. PC1≥–0.5) comprises from the samples from eastern parts of the species range (Crimea, Transcaucasia, Iran, Turkmenistan, Kazakhstan, Uzbekistan, Afghanistan), and (3) the group of medium-sized bats originates from three regions, from the Maghreb, the southern Balkans (Bulgaria, Greece) and from the Levant (Syria, Palestine, Hatay, Cyprus). The former two clusters show only a slight overlap, while the group (3) broadly overlaps with the other two. However, the populations falling into groups (1) and (3) are geographically connected and a continuous transition between these forms should exist, mainly in southwestern Europe. On the other hand, the present knowledge on the distribution of *M. emarginatus* in the Middle East rather shows an interrupted occurrence belt in its most continental parts, i.e. in eastern Turkey and northwestern

Table 19. (continued)

	Crimea & Transcaucasia					Central Asia					Iran & Afghanistan				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	15	**40.81**	39.6	42.0	0.870	32	**41.16**	38.6	44.0	1.275	6	**42.52**	40.6	44.1	1.367
LCr	13	**16.22**	15.68	16.60	0.265	32	**16.16**	15.33	16.62	0.309	11	**16.19**	15.65	16.79	0.370
LCb	13	**15.19**	14.73	15.75	0.308	32	**15.18**	14.52	15.53	0.265	11	**15.33**	14.85	15.83	0.315
LaZ	13	**9.83**	9.50	10.08	0.192	19	**9.84**	9.60	10.14	0.168	10	**9.89**	9.47	10.17	0.224
LaI	14	**3.66**	3.48	3.93	0.142	33	**3.63**	3.43	3.85	0.108	11	**3.68**	3.53	3.88	0.113
LaN	13	**7.38**	7.10	7.63	0.171	32	**7.50**	7.10	7.72	0.162	11	**7.51**	7.32	7.72	0.115
ANc	12	**5.87**	5.67	6.05	0.117	32	**5.79**	5.42	6.15	0.177	10	**5.83**	5.65	6.17	0.148
CC	14	**4.13**	3.92	4.28	0.119	31	**4.06**	3.75	4.26	0.127	11	**4.19**	3.95	4.58	0.176
M^3M^3	14	**6.27**	6.02	6.48	0.146	32	**6.30**	6.02	6.60	0.153	11	**6.43**	6.02	6.75	0.221
CM^3	15	**6.57**	6.37	6.78	0.122	32	**6.49**	6.25	6.72	0.115	11	**6.66**	6.47	6.94	0.164
LMd	14	**12.00**	11.62	12.45	0.292	35	**11.94**	11.30	12.28	0.234	11	**12.02**	11.54	12.38	0.277
ACo	12	**3.65**	3.40	3.98	0.160	32	**3.55**	3.35	3.87	0.129	11	**3.65**	3.51	3.87	0.117
CM_3	15	**7.03**	6.80	7.23	0.135	34	**6.97**	6.63	7.20	0.132	11	**7.10**	6.78	7.37	0.207
CC/CM^3	14	**0.630**	0.596	0.654	0.016	30	**0.627**	0.588	0.665	0.019	11	**0.629**	0.609	0.662	0.018
CM^3/LCb	13	**0.432**	0.426	0.442	0.004	30	**0.426**	0.417	0.437	0.006	10	**0.435**	0.426	0.439	0.004

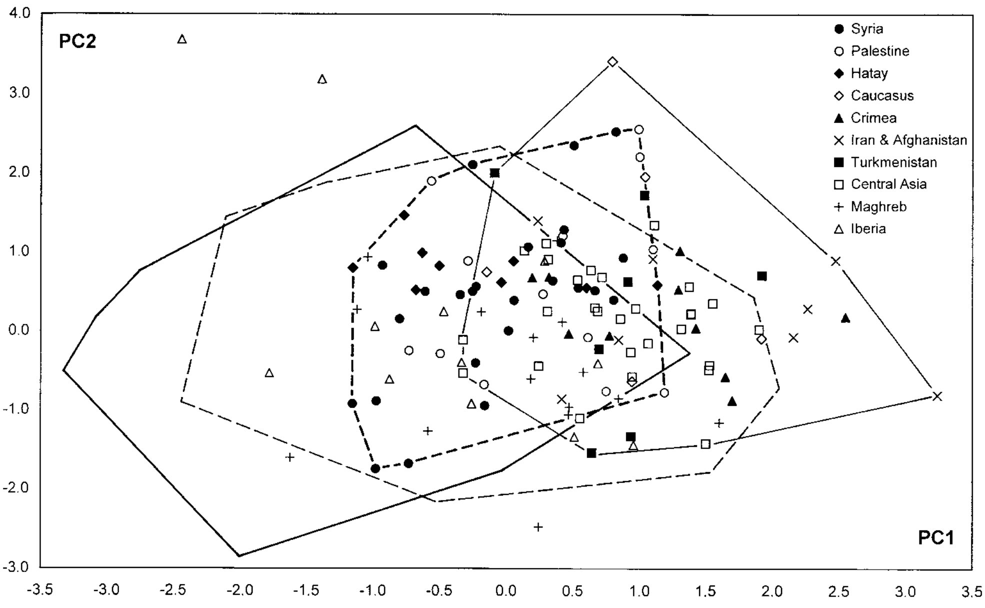

Fig. 77. Bivariate plot of examined Syrian and comparative samples of *Myotis emarginatus* (Geoffroy, 1806): results of the principal component analysis. Explanation: bold-lined polygon = samples of western and central Europe including the northern Balkans (n=90); thin-lined polygon = samples of eastern origin (Crimea, Caucasus and Transcaucasia, Central Asia, Iran and Afghanistan; n=56); thin-dashed polygon = Balkan samples (n=102); bold-dashed polygon = Levantine samples (n=55).

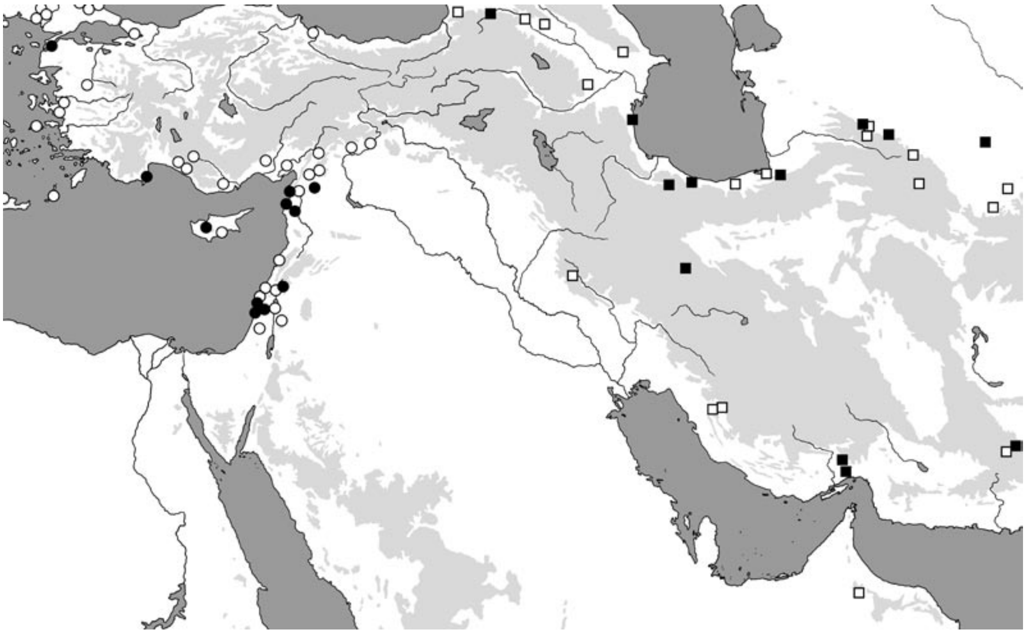

Fig. 78. Records of *Myotis emarginatus* (Geoffroy, 1806) in the Middle East: full symbols – sites of revised material origin, open symbols – sites of non-revised material origin, circles – *M. emarginatus emarginatus* (Geoffroy, 1806), squares – *M. e. desertorum* (Dobson, 1875).

Iran (Fig. 78). One part of the species range continues from the Balkans through Asia Minor to the Levant and another includes Iran, Transcaucasia to Crimea, and Central Asia. Only the latter one is inhabited by large individuals of the group (2) and is not directly connected with the remaining parts of the species distribution range.

Therefore, we conclude a tentative taxonomic interpretation of the morphometric variation in *M. emarginatus*, dividing the species content into two subspecies. The larger bats inhabiting most of the Asian part of the species distribution range (i.e. except the Levant, but including Crimea) can be co-identified with the name *M. e. desertorum*, the prior synonym in the region (with junior synonyms *lanaceus*, *turcomanicus*, *kuzyakini*). The generally smaller bats which are present in the Mediterranean region and adjacent areas can be co-identified with the nominotypical subspecies, which creates slightly larger forms (the medium-sized form of the above comparison) on the western (the Maghreb) and the eastern (the Balkans and the Levant) margins of its range. Since these differences are not substantial and since there is a distributional continuum among all Mediterranean populations, these larger forms also belong to the nominotypical subspecies (as already suggested by Ognev 1928, Harrison 1964a, Corbet 1978, Gaisler 1983, Harrison & Bates 1991, Kowalski & Rzebik-Kowalska 1991, Koopman 1994, Horáček et al. 2000, Karataş & Özgül 2003, etc.). This subspecies also includes the Syrian populations of *M. emarginatus*.

However, perhaps a genetic analysis covering possible maximum of the distribution range of *M. emarginatus* could bring convincing results, while the variation in metric traits or in pelage coloration rather reflect the phylogeographical history of the species.

FEEDING ECOLOGY. *Myotis emarginatus* is a medium-sized bat using mainly a gleaning strategy (Krull et al. 1991). Based on data from various parts of Europe, it feeds mostly on Araneae, Lepidoptera, Diptera and Lepidoptera larvae (Bauerová 1986, Beck 1995, Andreas 2002). Rahmatulina (2005) analysed the diet composition of *M. emargiantus* in Azerbaijan; she found Diptera, Lepidoptera, Coleoptera and Orthoptera to be a dominant part, complemented by Heteroptera, Odonata, Blattodea, Neuroptera, and Araneae. There is no study available concerning the diet composition in the Middle Eastern populations.

From Syria, we analysed digestive tract contents of seven specimens of *M. emarginatus* collected at the Qala'at Samaan castle. We recorded these particular food items: Araneae (73% of volume), Nematocera (3.5%), Brachycera (23.5%). These results prove the important role of gleaning strategy and high preference of Araneae in the feeding ecology of *M. emarginatus*.

Myotis aurascens Kusjakin, 1935

RECORDS. **Published data**: Quneitra/Golan Heights: Mount Hermon and Golan, summer 1995, four unidentified records mapped in northern and central parts of this region [roughly the areas of Mount Hermon (see also the Material examined), Mas'adah, Gamla and Ramot], Golan, 22 June 1995: maternal colony of several dozens of females (Mendelssohn & Yom-Tov 1999); all the records have been mentioned as of *M. mystacinus*.

POSSIBLE RECORD (Syria *sensu lato*). **Published data**: Syria, 1 fa, BMNH (Dobson 1878).

DISTRIBUTION. **General**. *Myotis aurascens* has only recently been defined as a separate species different from *M. mystacinus* (Benda & Tsytsulina 2000); it is a species with combined Mediterranean and eastern-European types of distribution (Benda 2004). The overall distribution range still remains indefinite, however, according to the available data, *M. aurascens* occurs in southeastern Europe from northern Italy, over Dalmatia and the Balkans to Moldavia, southern parts of Ukraine and European Russia. Southern margin of the range goes from the Balkans and Crete to the Near East, Caucasus Region and northwestern Iran (Benda & Tsytsulina 2000, Benda & Karataş 2005).

Near East. The Near East and the Caucasus region are areas of sympatric occurrence of several species formerly assigned to one species, *M. mystacinus* (Benda & Tsytsulina 2000, Benda & Karataş 2005); viz., *M. brandtii* (Eversmann, 1845) living in the forest zone of the northern Anatolia and in western Transcaucasia, *M. mystacinus* (Kuhl, 1817) occuring similarly in the northern Anatolia but the entire Caucasus Region, *M. aurascens* Kusjakin, 1935 inhabiting rather open habitats throughout the Near East and the Caucasus Region and *M. nipalensis* (Dobson, 1871) which reaches the eastern parts of the Near East, particularly arid regions of eastern Transcaucasia, northern Iran and eastern Turkey. Occurrence of two more species, *M. hajastanicus* Argyropulo, 1939 and *M. alcathoe* von Helversen et Heller, 2001, is also possible in this region (Benda & Karataş 2005). From all these forms, *M. aurascens* is the most frequently found species in the central and southern parts of the Near East (as well as in the Balkans), although *M. nipalensis* is also likely to be present there.

Bats of the *M. mystacinus* group (*M. mystacinus* s.l.) have been recorded in two regions of the Near East, the northern and the southern ones. The northern group of findings is available from Turkey and northwestern Iran. In Asia Minor, the records of *M. mystacinus* s.l. cover almost the whole country but they come mainly from rather humid coastal regions of the Pontic and Levantine mountains (Doria 1887, Kumerloeve 1975a, von Helversen 1989, Albayrak 1990a, 1991a, Obuch 1994, Hasbenli 1997, Benda & Horáček 1998, Benda & Tsytsulina 2000, Benda & Karataş 2005); nevertheless, some records from continental steppe areas of the Armenian Highlands have been published too (von Helversen 1989, Albayrak 1990a, Benda & Horáček 1998). The latter area is connected with the occurrence in high steppe regions of northwestern Iran (Harrison 1963b, Lay 1967, DeBlase 1980, Benda & Tsytsulina 2000).

The southern distributional spot of *M. mystacinus* (s.l.) (i.e. *M. aurascens*) in the Near East is restricted to the mountains of southwestern Syria (Mendelssohn & Yom-Tov 1999, Benda & Tsytsulina 2000, Benda & Karataş 2005).

Syria (Fig. 74). *M. aurascens* is a rare bat in Syria (Table 1). All more or less accurate records come from the Golan Heights area and Mount Hermon (Mendelssohn & Yom-Tov 1999). The species assignment has been confirmed in the only specimen available in TAU collection, however other three records mentioned by Mendelssohn & Yom-Tov (1999) presumably also belong to this species (Benda & Karataş 2005).

These records represent the only precise references of the *M. mystacinus*-like bats from Arabia, although in older literature at least one factual record appeared. A BMNH specimen of *M. mystacinus* (s.l.) has been reported from 'Syria' by Dobson (1878), however, no later reference that would comment this individual and/or record (its fate or clear origin) is available (see e.g. Harrison 1964a, Kumerloeve 1975b, Harrison & Bates 1991). The only more exact location was mentioned by Tristram (1884) who noted *M. mystacinus* 'in Southern Lebanon' [= southern edge of the Lebanon Mts], which may represent the above BMNH individual. Several subsequent authors accepted the distribution of *M. mystacinus* (s.l.) in Syria (Anderson 1881, Doria 1887, Trouessart 1879, 1897, Méhely 1900, Palacký 1902, Ryberg 1947) or suggested its occurrence in Palestine (Bodenheimer 1935, Theodor & Moscona 1954). According to Bodenheimer (1958), the 'Tel Aviv Museum records *M. mystacinus* from Tiberias'.

On the other hand, modern authors of mammal surveys of Arabia have doubted occurrence of *M. mystacinus* (s.l.) in northwestern Arabia (Harrison 1964a, Atallah 1977), although Harrison (l.c.) finally noted: "it may well eventually prove to exist there, since it is known in Persia and Armenia". Also Qumsiyeh (1996) expressed a hope in a final discovery of this bat in the Holy Land: "it perhaps exists in the Near East".

The eventual records of *M. mystacinus* (s.l.) [= *M. aurascens*] in Syria (Mendelssohn & Yom-Tov 1999, Benda & Karataş 2005) have confirmed the formerly dubious occurrence of this form after more than a century. However, there is an apparent discontinuity in records of about 400–500 km between Cilicia, where the southernmost findings in Turkey were made (Kumerloeve 1975a, Benda & Horáček 1998), and the southern Lebanon and Anti-Lebanon Mts, the only occurrence spots in the Levant (Tristram 1884, Mendelssohn & Yom-Tov 1999) (Fig. 74). This distribution pattern suggests an insulated population restricted to higher continental areas of the Lebanon and Anti-Lebanon Ridges, similarly as e.g. *Chionomys nivalis hermonis* (Miller, 1908) which occurs only in these ridges in Arabia (Harrison & Bates 1991). However, a more profound research in Lebanon as well as in western Syria is needed to be able to confirm this statement.

FIELD NOTES. Mendelssohn & Yom-Tov (1999: 124) reviewed the data on reproduction of the Golan population of *Myotis mystacinus* [= *M. aurascens*]: "Males with developed testes were found between June–September. A maternal colony of several dozen females was found in the Golan on 22 June 1995, in which two females were still lactating".

MATERIAL EXAMINED. 1 m (TAU M.9456 [S+B]), Mount Hermon, 2 September 1994, leg. B. Shalmon.

MORPHOLOGY. See Table 20 for biometric data on the examined Syrian specimen of *Myotis aurascens* (for more dimesions see Benda & Karataş 2005).

TAXONOMY. The western Palaearctic populations of bats of the *Myotis mystacinus* morpho-group were primarily classified as one highly variable species, *M. mystacinus* (Kuhl, 1817) (Tate 1941b, Ellerman & Morrison-Scott 1951, Kuzjakin 1965, etc.). All records of the group from the Middle East were assigned to this species (Harrison 1963b, Lay 1967, Çağlar 1969). Based on morphological comparison, another species was identified in the group in the 1960s, namely *M. brandtii* (Eversmann, 1845) (Topál 1958, Hanák 1965, 1970, Gauckler & Kraus 1970). Later, this species was confirmed to occur in the broad area of Palaearctic forests from western Europe to the Far East (Hanák 1970, Baagøe 1973, Strelkov 1983a, b, Strelkov & Buntova 1982, etc.). However, in the Middle East *M. brandtii* was found in northern Turkey only (Albayrak 1990a, 1991a, 2003, Steiner & Gaisler 1994, Benda & Karataş 2005). The Middle Eastern populations of *M. mystacinus* in the sense by Hanák (1970) and Strelkov (1983a) were assigned to various forms (see also Benda & Horáček 1998 for a review); *M. m. mystacinus* (Kuhl, 1817) (terra typica: Hessen, Germany) by Corbet (1978) and by Koopman (1994); *M.* (*m.*) *przewalskii* Bobrinskoj, 1926 (t.t.: Moldža river canyon, N margin of the Russkij [Hotan-tag] Range, E Turkestan, China) by von Helversen (1989); *M. m. hajastanicus* Argyropulo, 1939 (t.t.: Šordža on the eastern bank of the Sevan Lake, Armenia) by Albayrak (1991a); and *M. m. aurascens* Kusjakin, 1935 (t.t.: Kurkužin near Vladikavkaz, Russia) has been mentioned from the forest parts of the Caucasus (Strelkov 1983a, Tupinier & Aellen 2001).

However, in the last years, several morphological and/or genetic studies have revealed a further hidden diversity in the *M. mystacinus* group (Benda & Tsytsulina 2000, Tsytsulina 2000a, b, Mayer & von Helversen 2001a, von Helversen et al. 2001, Benda & Karataş 2005) and several species of the group have been recognised in the Mediterranean region (*M. mystacinus*, *M. brandtii*, *M. aurascens*, *M. nipalensis*, *M. hajastanicus*, *M. alcathoe*), see Distribution. Some of these species, however, stretch to the northern part of the Near East, while only *M. aurascens* has been confirmed in the Mediterranean part of this region (Benda & Karataş 2005).

Benda & Tsytsulina (2000) and Benda (2004) mentioned a cline shift in cranial dimensions of *M. aurascens* from the west to the east in its European range. They described the individuals from southeastern Europe (Dalmatia, the Balkans) to be on average smaller than those from eastern Europe (Moldavia, southern Ukraine), see Table 20. However, this phenomenon has not been found in the populations of the Middle East, incl. the Caucasus region. The samples from the Near East, Trans- and Ciscaucasia showed a similar variation range of the largest skull dimensions as the SE European populations (Table 20). This comparison shows that the variation noted by Benda & Tsytsulina (2000) is a south-north gradient of cline, rather than the west-east one. This observation conforms well with the Bergmann's rule; the individuals from southern parts of the species range, including Dalmatia, the Balkans, Asia Minor, Syria and Caucasus region, are generally smaller than the bats occurring in the continental steppes of eastern Europe, which lie north of the Mediterranean and on the northern margin of the species range. However, the overlap in the dimension values of northern and southern samples is too broad for any clear separation of these populations. Moreover, the dimensional shift appears to be a cline rather than a step, as Benda & Tsytsulina (2000) already noted. Thus, *M. aurascens* seems to be a monotypic species in the western Palaearctic, in which only moderate cline variation is present.

Although only one specimen of *M. aurascens* from Syria has been available for examination as well (see the Material examined), Mendelssohn & Yom-Tov (1999) mentioned external measurements (forearm length and weight) from other individuals recorded in the Golan Heights and on Mount Hermon. They gave data on 17 bats provided by B. Shalmon: 13 males, forearm length (LAt) range 34.8–40.0 mm (mean 38.0); body weight (G) range 6.0–8.6 g (mean 7.5); and 4 females, LAt 37.6–41.1 mm (39.5), G 6.0–8.5 (7.2). However, the LAt values seem to be too high in comparison with other data (see Table 20 or data given by Benda & Tsytsulina 2000). Among 375 examined specimens of bats of the *M. mystacinus* group from the western part of the Palaearctic (both dry and alcohol preparations), only four individuals exceeded the forearm length

Table 20. Basic biometric data on examined Syrian and comparative samples of *Myotis aurascens* Kusjakin, 1935 and on other taxa of the *M. mystacinus* morpho-group. For abbreviations see pp. 10, 11

	M. aurascens	*M. aurascens*					*M. nipalensis*				
	Syria	Middle East & Caucasus					Middle East & Transcaspian Reg.				
	TAU M9456	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	34.1	16	**35.01**	33.5	37.3	1.094	19	**33.63**	31.7	34.9	0.849
LCr	13.70	36	**13.89**	13.20	14.57	0.313	33	**13.46**	12.73	13.95	0.276
LCb	13.25	35	**13.20**	12.50	14.15	0.368	32	**12.77**	12.21	13.25	0.234
LaZ	–	25	**8.42**	8.03	8.83	0.207	23	**8.21**	7.67	8.58	0.227
LaI	3.78	37	**3.52**	3.18	3.94	0.174	34	**3.38**	3.17	3.62	0.114
LaN	6.73	37	**6.80**	6.48	7.62	0.222	34	**6.61**	6.35	6.92	0.140
ANc	4.72	34	**4.90**	4.43	5.52	0.194	34	**4.74**	4.43	4.93	0.140
CC	3.20	36	**3.38**	3.13	3.60	0.119	32	**3.32**	3.12	3.55	0.129
M^3M^3	5.30	35	**5.39**	5.07	5.80	0.181	32	**5.21**	4.92	5.52	0.112
CM^3	5.43	36	**5.18**	4.90	5.80	0.198	33	**4.99**	4.74	5.23	0.132
LMd	9.93	35	**9.80**	9.25	10.83	0.299	32	**9.48**	8.95	9.75	0.191
ACo	2.85	35	**2.76**	2.53	3.05	0.131	32	**2.68**	2.45	2.85	0.097
CM_3	5.80	34	**5.55**	5.30	6.03	0.180	30	**5.39**	5.08	5.58	0.104
ACn	–	34	**0.05**	0.00	0.12	0.028	35	**0.06**	0.00	0.15	0.034
RCn	1.43	33	**1.37**	1.28	1.51	0.059	32	**1.37**	1.24	1.51	0.069

	M. aurascens														
	Adriatic Countries					Balkans					Eastern Europe				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	23	**34.95**	32.2	36.7	1.212	36	**34.73**	33.1	36.6	0.959	7	**34.46**	33.0	35.6	0.875
LCr	19	**14.04**	13.32	14.55	0.342	48	**14.05**	13.42	14.42	0.215	31	**14.28**	13.85	14.90	0.264
LCb	20	**13.24**	12.45	13.80	0.356	46	**13.30**	12.77	13.67	0.211	31	**13.44**	12.25	13.87	0.327
LaZ	14	**8.43**	8.00	8.73	0.210	35	**8.53**	8.05	9.02	0.180	21	**8.68**	8.23	9.07	0.247
LaI	22	**3.46**	3.18	3.75	0.120	48	**3.43**	3.17	3.67	0.119	31	**3.60**	3.38	3.92	0.133
LaN	20	**6.75**	6.45	7.00	0.145	48	**6.82**	6.44	7.18	0.159	31	**6.99**	6.72	7.27	0.140
ANc	20	**4.86**	4.62	5.02	0.113	48	**4.91**	4.57	5.27	0.157	31	**4.99**	4.58	5.27	0.147
CC	21	**3.45**	3.05	3.68	0.155	47	**3.46**	3.17	3.67	0.114	31	**3.60**	3.42	3.87	0.114
M^3M^3	21	**5.38**	5.05	5.70	0.159	48	**5.43**	5.18	5.68	0.129	31	**5.51**	5.23	5.72	0.133
CM^3	22	**5.17**	4.75	5.48	0.187	48	**5.22**	4.88	5.62	0.125	31	**5.20**	4.97	5.43	0.120
LMd	22	**9.82**	9.32	10.20	0.297	47	**9.92**	9.55	10.28	0.187	31	**10.04**	9.60	10.43	0.197
ACo	20	**2.79**	2.60	2.95	0.096	47	**2.83**	2.62	3.12	0.097	30	**2.86**	2.60	3.08	0.141
CM_3	22	**5.55**	5.08	5.92	0.222	47	**5.66**	5.30	5.92	0.124	31	**5.61**	5.35	5.93	0.131
ACn	15	**0.04**	0.00	0.06	0.015	47	**0.05**	0.01	0.12	0.027	31	**0.04**	0.00	0.10	0.027
RCn	9	**1.34**	1.27	1.40	0.045	48	**1.31**	1.11	1.51	0.079	30	**1.37**	1.24	1.50	0.071

(taken incl. the wrist) of 37 mm; viz. one *M. aurascens* from Turkey and one *M. hajastanicus* from Armenia (both alcohol specimens with LAt 37.3 mm) and two European individuals of *M. brandtii* (both with LAt 37.1 mm). Values above the level of 38 mm do not occur in this extensive series. Thus, the data by Mendelssohn & Yom-Tov (1999) were taken either (1) by a very unusual technique; or (2) in a different bat taxon or taxa. The latter possibility suggests that the researchers made a mistake in species identification (e.g., the dimensions might have been taken in subadult individuals of *M. emarginatus*) or that a different form of the *M. mystacinus* morpho-group occurs in the southern Levant beside *M. aurascens*. However, more individuals from Syria and Lebanon are need to be examined for a satisfactory explanation of this enigma.

Myotis capaccinii (Bonaparte, 1837)

Records. **Original data**: Deir ez Zur: Abu Kamal [1], a pool in the Wadi ar Ratgah, 16 May 2001: net. 1 fs; – As Salihiyyah [2], ruins of ancient Dura Europos, 19 April 2001: 2 inds. from *Tyto alba* pellets; – Halabiyyeh [3], ruins of ancient fortress town, 17 June 1998: 12 inds. from *Tyto alba* pellets; 15 April 2001: 19 inds. from *Tyto alba* pellets; – Tell Sheikh Hamad [4], above the Al Khabour River, 16 April 2001: det. min. 1 ind. – Halab: Halab [5], 4 July 1914: coll. a nursery colony (2 ma, 9 faL, 1 fa, 7 mj, 11 fj; specimens in NMW). – Raqqa: Al Ghazli [6], a wadi ca. 2 km to S, 11 May 2001: net. 1 faL; – Kisret Mhamadali [7], rocky cliff, 28 June 1998: 1 ind. from *Tyto alba* pellet. – **Published data**: Deir ez Zur: Madan [8], small karst cave ("Staubleichenhöhle"), obs. (Walter & Ebenau 1997). – Raqqa: Cater (= Qatr) Magara cave [9], 12 March 1994: obs. 30 inds., coll. parasites (Ebenau 1994, 1996, Walter & Ebenau 1997); – Qasret Mohammed Ali (= Kisret Mhamadali) [7], 28 June 1998: 1 ind. from owl pellets (Shehab et al. 2004); – Raqqa, "Taubenbrunnen" cave [10], 1993: 7 inds. (in osteological cave deposit); 1994: obs. 60 inds., net. 2 inds. (Ebenau 1994, 1996). – Quneitra/Golan Heights: Mount Hermon and Golan, three unidentified records mapped in northern and southern parts of this region [roughly the areas of Mount Hermon, Baniyas and Ramot] (Mendelssohn & Yom-Tov 1999).

Possible records (Syria *sensu lato*). **Published data**: Syrien, 1 ind., [ded.] Dr. Rey (Nehring 1886). – Syrie, 1878: 1 ind. ad. (Jentink 1888; as *Vespertilio dasycneme*).

Distribution. **General**. *Myotis capaccinii* is a species with Mediterranean type of distribution (Corbet 1978, Koopman 1994, Horáček et al. 2000, Spitzenberger & von Helversen 2001). It occurs in the Maghreb from northeastern Morocco to Tunisia, and in southern Europe from eastern Iberia to the Balkans (incl. some Mediterranean islands), northernmost records being available from the Swiss and Austrian Alps and from southern Romania; in Asia, the range continues in the Near East (Kahmann & Çağlar 1960, Horáček et al. 2000, Spitzenberger & von Helversen 2001). The only record of *M. capaccinii* in Central Asia was made in 1875 in the present-day Uzbekistan (Kuzjakin 1950)*.

Near East. *M. capaccinii* inhabits almost the entire Near East, it is absent from northern Turkey and the most continental mountainous parts of the Armenian Highlands in Turkey and Iran as well as from the true deserts in southern areas of the region and in Arabia (DeBlase 1980, Harrison & Bates 1991, Karataş et al. 2003a). In the Near East, *M. capaccinii* reaches southern and eastern margins of its distribution range in the southwestern Iran.

M. capaccinii occurs in the most of the Mediterranean parts of western and southern Turkey (Kahmann & Çağlar 1960, Kahmann 1962, Osborn 1963, Çağlar 1965, DeBlase & Martin 1973, Spitzenberger 1973, Kock 1974, von Helversen 1989, Albayrak 1990a, b, 1993a, Hasbenli 1997, Benda & Horáček 1998, Özgül et al. 2000, Albayrak & Aşan 2002, Furman & Özgül 2002, Karataş et al. 2003a, 2004, Yiğit et al. 2006); most recently, individual records of this bat have been published from central and southeastern Anatolia (Karataş et al. 2003a).

In Lebanon and Jordan, *M. capaccinii* has been recorded only once. The finding of this bat in Lebanon was reported by Atallah (1970) from near Amchite close to the Mediterranean shore. Qumsiyeh et al. (1986) made a record from Tabqat Fahl in the Jordan Valley, Jordan. In Palestine, a few records come from the northernmost part of the country, including the Galilee, Mount Carmel, and the Yizre'el and Hula Valleys (Bodenheimer 1935, Harrison 1964a, Makin 1977, 1987, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999). However, some older mentions of *M. daubentonii* (Kuhl, 1817) and/or *M. dasycneme* (Boie, 1825) from Palestine (Tristram 1884,

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* Note. Kuzjakin (1950) mentioned an old Central Asian record of this bat from Nukus in the Amu-Darya Delta, under the older taxonomic conception of *M. capaccinii*, which covered several presently separate species (see Spitzenberger & von Helversen 2001). Although some Russian authors accepted Kuzjakin's (1950) assignment to *M. c. capaccinii* (= present days *M. capaccinii*) (Bogdanov 1953, Strelkov 1963, 1981, Kuzjakin 1965), we suggest rather a different affiliation of the record, which could be geographically more reasonable, e.g. *M. longipes* (Dobson, 1873) (see Hanák & Gaisler 1969). Bogdanov (1953) mentioned location of the respective Uzbek specimen in the ZIN collection and therefore the revision of the species assignation should be relatively simple.

Bodenheimer 1935, 1958, Ryberg 1947) very probably represented the records of *M. capaccinii*, actually (Doria 1887, Harrison 1964a).

M. capaccinii inhabits the Euphrates Valley from southern Turkey to central Iraq. The Iraqi records are available from the environs of Kish, Haditha, and Baghdad (Sanborn 1956, Khajuria 1988, Abul-Hab & Shihab 1989). Unspecified records from Iraq have been mentioned by Shamsuddin & Mohammad (1978) and Topál (1997). The Euphrates distribution connects the records in southwestern Iran, where *M. capaccinii* has been found in the Mesopotamian lowland as well as in the Zagros Mts (Etemad 1963, DeBlase 1971, 1980, our unpubl. data).

One or two unconfirmed records of *M. capaccinii* have been published from Cyprus (Kahmann & Çağlar 1960, Kock 1974).

Syria (Fig. 66). *M. capaccinii* is a medium-frequent bat in Syria, 13 records are available (Table 1). It has been recorded in two different regions of the country. Most Syrian records come from the Euphrates Valley [1–3, 7–10] and from its adjacent areas of the Khabur and Balikh Valleys [4, 6] (Ebenau 1994, 1996, Shebab et al. 2004, our data). These relatively abundant occurrences connect records in Iraq in the southeast (Haditha; Khajuria 1988) and in Turkey in the north (Viranşehir; Karataş et al. 2003a). This riparian occurrence in desert habitats of Mesopotamia is unique between the Palaearctic *Myotis* species; *M. capaccinii* shows the largest adaptability to desert conditions within the whole genus in the Middle East.

Another region of occurrence of *M. capaccinii* in Syria is the Levantine part of the Mediterranean woodland and steppe-maquis zones. However, from this area only a few records are known from two spots; three records have been mentioned from Mount Hermon and the Golan Heights (Mendelssohn & Yom-Tov 1999) and one record comes from northwestern Syria [5] (our data). In spite of common distribution of this bat in Cilicia and Hatay (Kahmann & Çağlar 1960, Osborn 1963, Çağlar 1965, Benda & Horáček 1998, Albayrak 1990a, Karataş et al. 2003a) as well as of relativrly frequent records in Palestine (Mendelssohn & Yom-Tov 1999), the lack of records in large areas of the Syrian and Lebanese parts of the Levant is quite surprising. However, in the Mediterranean zone of Syria *M. capaccinii* should be found by a more intensive research.

The oldest mentions of *M. capaccinii* from 'Syria' were provided by Nehring (1886) and most probably also by Jentink (1888). The former author reported an alcohol specimen of '*Vespertilio Capaccinii*' in ZMB, and its species identification has been confirmed recently by examination of the reference bat (ZMB 15004). The latter author, nevertheless, reported '*Vespertilio dasycneme*' which is an apparent nonsense because *M. dasycneme* is a rather boreal species distributed mainly in the northern part of the Palaearctic (the southern margin of its range goes through the northern Balkans, at most; see Limpens 2001 and Roer 2001). However, the latter mention most probably also refers to *M. capaccinii*, although the reference specimen has not been examined. Anyway, both these reports have been labelled 'Syria' in its broader sense; therefore *M. capaccinii* was for the first time recorded from the present-day Syria for sure by Ebenau (1994, 1996) as already Shehab et al. (2004) pointed out.

Field notes. Individuals of *Myotis capaccinii* were recorded only by netting at tributaries of the Euphrates river. A subadult female was netted above a temporary pool in a sand pit in the Wadi ar Ratgah at Abu Kamal (together with numerous *P. kuhlii*; Fig. 79). Another female (Fig. 81) was netted under a bridge over a small side wadi of the Al' Balikh valley at Al Ghazli (Fig. 80; one *O. hemprichii* was found at the same place). Ebenau (1994, 1996) and Walter & Ebenau (1997) reported observations of this species in karstic caves in the Euphrates Valley, including two colonies of ca. 30 and 60 individuals, respectively. Both these caves were shared also by large colonies of *M. schreibersii*, one of them (Qatr Magara) also by *R. ferrumequinum* and *R. mehelyi*.

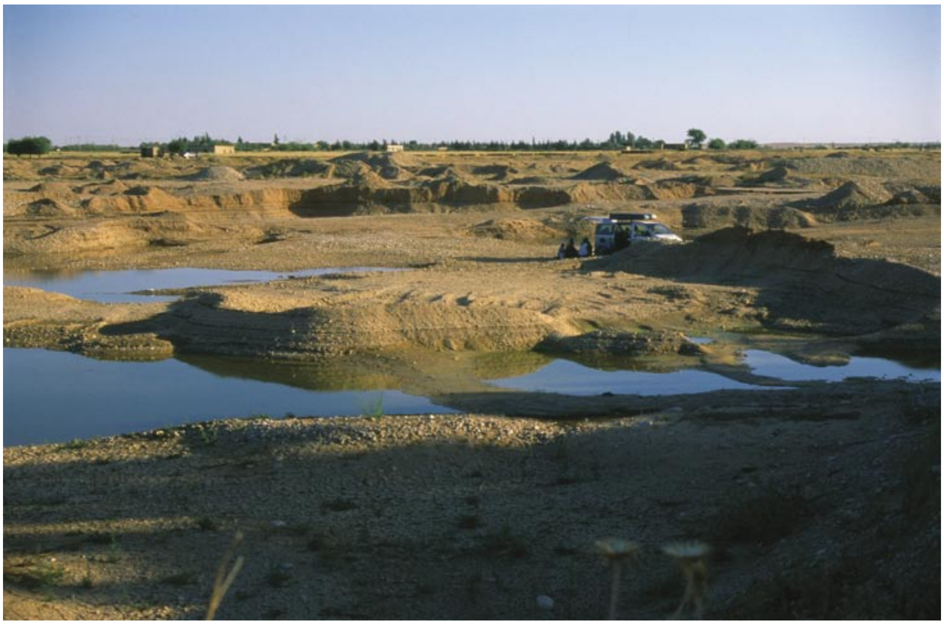

Fig. 79. Temporary pools in a sand pit in the Wadi ar Ratgah at Abu Kamal. The netting site of *Myotis capaccinii* and *Pipistrellus kuhlii* (photo by A. Reiter).

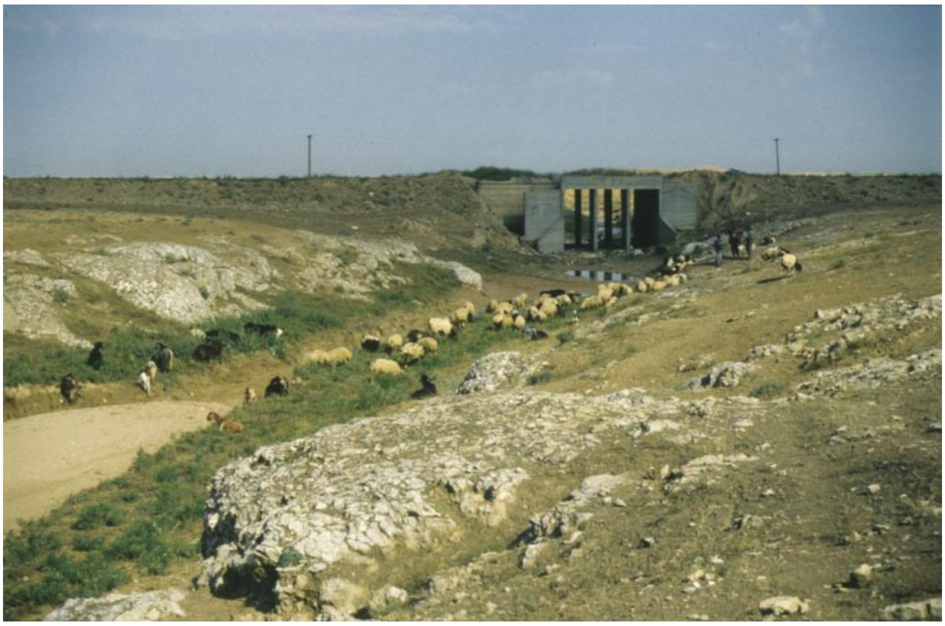

Fig. 80. Dry wadi at Al Ghazli, a tributary of the Al' Balikh river. Site of netting of *Myotis capaccinii* and finding of *Otonycteris hemprichii* (photo by A. Reiter).

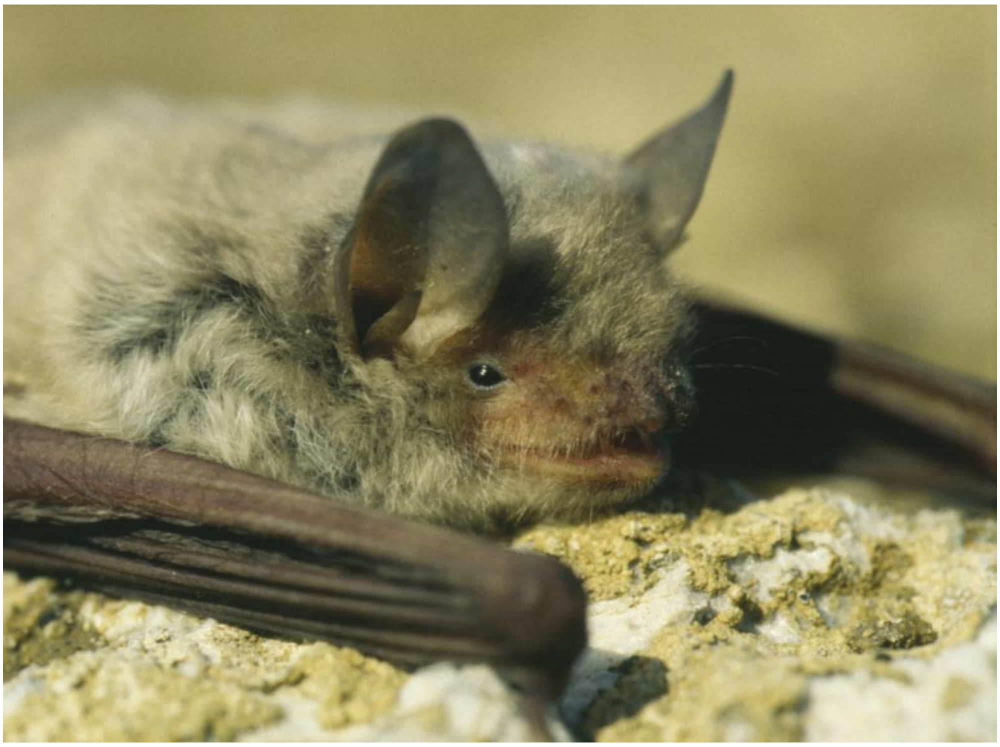

Fig. 81. Portrait of *Myotis capaccinii* (Bonaparte, 1837) from Al Ghazli (photo by A. Reiter).

A sample of 30 specimens deposited in NMW represents a part or even a whole colony collected in or near Halab on 4 July 1914. The sample consists of nine lactating females and 18 juveniles (besides the male and subadult female specimens). Also a female netted at Al Ghazli on 11 May 2001 was lactating. Harrison (1964a) and Mendelssohn & Yom-Tov (1999) reported females of high degree of pregnancy to be observed in Palestine in April, and juveniles at the end of April. These data may indicate the occurrence of births in the Levant from the end of April to early May.

M. capaccinii was frequently found in the diet of *Tyto alba* in Syria (Shehab et al. 2004, our data), while in the diet of other owls it was not recorded. Its remains represented 0.06–1.02% per sample volume of all prey items of the barn owl diet from Syria (and 0.07–1.14% of mammalian and 0.18–7.95% of bat items) analysed by us (Table 35). In the Near East, remains of *M. capaccinii* were found also in the diet of *Bubo bubo* in Iran (Obuch unpubl.).

Material examined. 1 fs (NMP 48806 [S+A]), Abu Kamal, 16 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 ma, 7 mj, 9 fa, 1 fs, 11 fj (NMW 22056–22067 [S+A], 22068–22085 [A]), Aleppo (= Halab), 4 July 1914, leg. V. Pietschmann, Armenien-Expedition 1914; – 1 fa (NMP 48765 [S+A]), Al Ghazli, 11 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 inds. (NMP 90368; 2 right mandibles, 1 left mandible, from owl pellets), As Salihiyyah, Dura Europos, 19 April 2001, leg. J. Obuch; – 12 inds. (NMP 90369; 1 skull, 8 rostra, 1 left maxilla, 3 right maxillae, 12 left mandibles, 12 right madibles, from owl pellets), Halabiyyeh, 17 June 1998, leg. J. Obuch; – 19 inds. (NMP 90370; 4 skulls, 8 rostra, 5 right maxillae, 7 left maxillae, 16 left mandibles, 16 right mandibles, from owl pellets), Halabiyyeh, 15 April 2001, leg. J. Obuch; – 1 ind. (ISEA M/11807; 1 rostrum, 1 right mandible, from owl pellet), Kisret Mhamadali, 28 June 1998, leg. A. Shehab; – 1 m (ZMB 15004 [A]), Syria, before 1886, vend. Dr. Rey.

Morphology. See Table 21 and Appendix III for biometric data on the Syrian specimens of *Myotis capaccinii*.

Taxonomy. *Myotis capaccinii* is often considered to be a monotypic species (Strelkov 1963, Hayman & Hill 1971, Corbet 1978, Gaisler 1983, Horáček et al. 2000, Spitzenberger & von Helversen 2001, Simmons 2005) and all populations should belong to the nominotypical form, *M. c. capaccinii* (Bonaparte, 1837) (terra typica: Sicilia [= Sicily, Italy]). However, Heinrich (1936) described a distinct subspecies named *Leuconoe capaccinii bureschi* from 'Dorf Karamlek, Strandjabalkan, 250 m, Bulgarien' (= Karamlăk [nowadays Mladežko], Strandža Mts, SE Bulgaria, see Benda et al. 2003b) on the basis of the different pelage coloration: "Oberseite von einer schönen hell taubengrauen Färbung ohne fahlen Auflug. Auf die Unterseite sind die Haarspitzen reinweiss statt bräulichweiss." Existence of this subspecies was adopted by Ellerman & Morrison-Scott (1951) and by Sanborn (1956) who applied it to his record of *M. capaccinii* in Iraq (as a second record of the subspecies). The Sanborn's (1956) note was accepted without any doubts by most of subsequents authors for *M. capaccinii* populations from the Middle East (Hatt 1959, Harrison 1964a, Atallah 1970, 1977, DeBlase 1980, Harrison & Bates 1991, Qumsiyeh et al. 1992, Koopman 1994, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Guillén in Mitchell-Jones et al. 1999, Ferguson 2002).

Kahmann & Çağlar (1960) were the first who doubted validity of a subspecific level of the sample described as *L. c. bureschi*. They suggested that the described colour difference denoted a juvenile coloration, and therefore the description of *bureschi* might cover juvenile stages of the

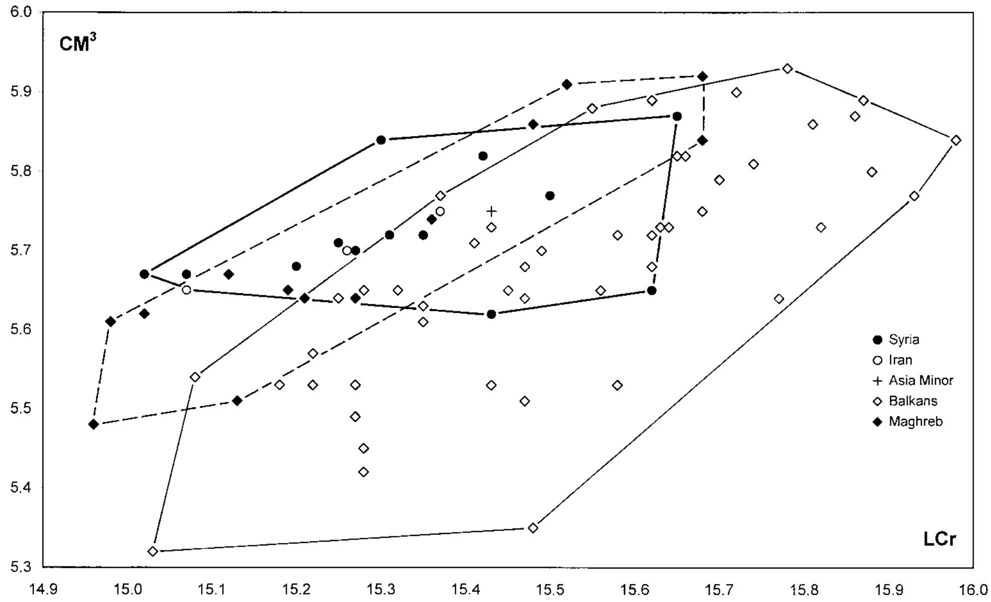

Fig. 82. Bivariate plot of examined Syrian and comparative samples of *Myotis capaccinii* (Bonaparte, 1837): greatest length of skull (LCr) against the length of upper tooth-row (CM^3). Explanation: bold-lined polygon = Mesopotamian samples (n=17); thin-lined polygon = Balkan samples (n=50); dashed polygon = Maghrebian samples (n=14).

Table 21. Basic biometric data on examined Syrian and comparative samples of *Myotis capaccinii* (Bonaparte, 1837). For abbreviations see pp. 10, 11

			Syria					Iran		
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	14	**41.01**	39.6	42.4	0.873	3	**41.83**	41.0	42.3	0.723
LCr	14	**15.32**	15.02	15.65	0.200	3	**15.23**	15.07	15.37	0.152
LCb	14	**14.26**	14.02	14.47	0.148	3	**14.12**	13.91	14.28	0.190
LaZ	5	**9.39**	9.17	9.58	0.154	3	**9.26**	9.12	9.42	0.150
LaI	24	**3.62**	3.48	3.78	0.084	3	**3.54**	3.52	3.58	0.035
LaN	14	**7.91**	7.70	8.10	0.128	3	**7.78**	7.54	7.97	0.218
ANc	1	**5.62**	–	–	–	3	**5.72**	5.59	5.82	0.118
CC	2	**3.98**	3.92	4.03	0.078	3	**3.92**	3.90	3.94	0.020
M^3M^3	5	**6.11**	5.97	6.27	0.118	3	**6.04**	5.98	6.10	0.060
CM^3	14	**5.73**	5.62	5.87	0.074	3	**5.70**	5.65	5.75	0.050
LMd	61	**10.68**	10.05	11.11	0.187	3	**10.71**	10.56	10.90	0.175
ACo	46	**2.83**	2.68	3.02	0.090	3	**2.93**	2.82	3.01	0.100
CM_3	14	**6.10**	5.90	6.22	0.088	3	**6.15**	6.05	6.23	0.093
CM^3/LCr	13	**0.373**	0.362	0.382	0.005	3	**0.374**	0.374	0.375	0.001
CC/CM^3	2	**0.687**	0.671	0.702	0.022	3	**0.688**	0.682	0.697	0.008

			Maghreb					Balkans		
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	0	–	–	–	–	59	**41.64**	39.4	44.0	1.043
LCr	14	**15.28**	14.96	15.68	0.240	50	**15.50**	14.70	15.98	0.266
LCb	14	**14.36**	13.93	14.82	0.257	45	**14.42**	13.95	14.93	0.245
LaZ	11	**9.49**	9.15	9.84	0.205	39	**9.43**	8.52	9.83	0.247
LaI	14	**3.61**	3.42	3.76	0.091	54	**3.63**	3.24	3.83	0.118
LaN	14	**7.93**	7.73	8.14	0.117	55	**7.95**	7.21	8.22	0.174
ANc	14	**5.63**	5.24	5.86	0.143	51	**5.73**	5.42	6.12	0.141
CC	14	**3.93**	3.77	4.08	0.099	54	**3.90**	3.07	4.17	0.189
M^3M^3	14	**6.14**	5.94	6.34	0.112	54	**6.04**	5.10	6.47	0.261
CM^3	14	**5.71**	5.48	5.92	0.143	58	**5.67**	4.92	6.37	0.208
LMd	14	**10.96**	10.62	11.28	0.202	56	**10.83**	9.80	11.38	0.289
ACo	14	**3.06**	2.81	3.54	0.188	54	**2.93**	2.55	3.28	0.140
CM_3	14	**6.04**	5.80	6.24	0.133	56	**6.01**	5.63	6.53	0.154
CM^3/LCr	14	**0.374**	0.364	0.381	0.005	49	**0.365**	0.328	0.378	0.008
CC/CM^3	14	**0.688**	0.649	0.720	0.017	53	**0.689**	0.634	0.734	0.021

nominotypic form. This conclusion was later confirmed by an analysis of the Balkan material (Mirić 1973).

However, beside the unavailability of the name *bureschi* for its attribution to *M. capaccinii* from the Middle East, several authors mentioned distinctness of these populations. Harrison (1964a) found Palestinian samples to be "whiter on the belly and paler on the back than *M. c. capaccinii*" and suggested a subspecific status for these populations. Atallah (1970) also mentioned colour differences of Lebanese sample which would deserve taxonomic differentiation. Albayrak (1990b) and Albayrak & Aşan (2002), who compared Turkish populations with other Middle Eastern and with European ones, found metric differences between Palestinian and Persian samples and those from the rest of the distribution range (Europe and Asia Minor) – unfortunately, they compared literature data only. As a result, they suggested a separate subspecific status for bats from Palestine and Iran. Similarly, Topál (1997) found significant craniometrical differences between European and Iraqi samples of *M. capaccinii*, what in his view conformed with subspecific division.

These data suggest that there are more than only one morphotype within the species rank of *M. capaccinii* (contra e.g. Corbet 1978, Horáček et al. 2000, Spitzenberger & von Helversen 2001, Simmons 2005), however, the zone of transition between the possible two morphotypes of *M. capaccinii* lies in the centre of the Middle East rather than in the centre of the Balkans (contra e.g. Harrison 1964a, Atallah 1977, Harrison & Bates 1991, Koopman 1994, etc.). Thus, the Syrian population presumably has a crucial position for understanding of such type of variation.

The coloration in the examined Syrian specimens of *M. capaccinii* shows a slightly paler tinge of the dorsal pelage than in the Balkan samples, however, it seems to be a direct influence of semi-desert conditions of the Euphrates Valley, the region of origin of Syrian bats (see Distribution). The comparison of skull dimensions of four limited samples of *M. capaccinii* from the Mediterranean and Mesopotamia, including the Syrian ones (Table 21), does not demonstrate any substantial differences among them. However, a comparison of the relative rostral length (CM^3/LCr; Table 21, Fig. 82) shows a slight difference between the European samples and the Maghrebian and Middle Eastern ones. The bats from Algeria, Syria and Iran have relatively longer rostrum than bats from the Balkans. The discriminant function analysis of selected five highly significant skull measurements (LCr, LCb, CM^3, LMd, CM_3) of the respective samples (Fig. 83; CV1=59.08%; CV2=38.51% of variance) defined three clusters, viz. the Balkan, the Maghrebian and the Middle Eastern populations.

These preliminary results, similarly as the data reported by previous authors (Albayrak 1990b, Albayrak & Aşan 2002, Topál 1997), suggest a rather hidden intraspecific variation within *M. capaccinii*. Based on our morphometric evidence, the bats from Mesopotamia and the Levant (i.e.

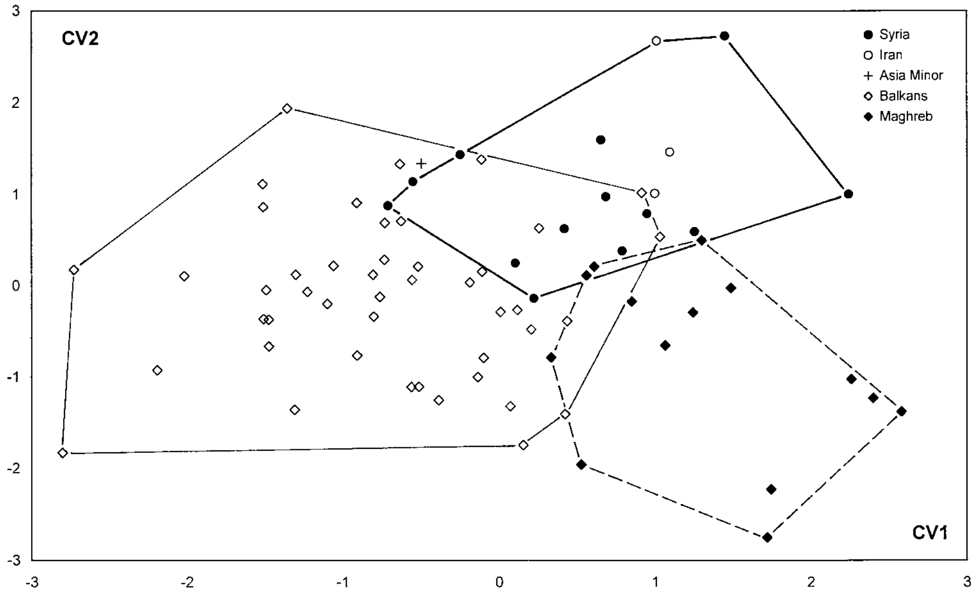

Fig. 83. Bivariate plot of examined Syrian and comparative samples of *Myotis capaccinii* (Bonaparte, 1837): results of discriminant analysis. For explanation see Fig. 82.

to the south and east of Syria, incl.) constitute a morphotype separate from that of the European population. However, only a profound morphological analysis based on representative samples from the whole Mediterranean could confirm whether the distinctness found here represents real step differences deserving a taxonomic expression or only marginal stages of cline shifts in variation throughout the Mediterranean region. Anyway, if *M. capaccinii* from southern and eastern parts of the Middle East really is a separate taxon, the name *bureschi* is unavailable for its designation.

Feeding ecology. *Myotis capaccinii* is a medium-sized bat, hunting mainly above the surface of still water (Spitzenberger & von Helversen 2001). Only a few data are available on the food of this species. Aiharitza et al. (2003) analysed eight pellets of four individuals of *M. capaccinii* from Spain and found fish to be the most important prey category followed by Diptera and Trichoptera. Trichoptera, Auchenorrhyncha and Lepidoptera were reported to be the most frequent diet items in the samples collected in southwestern Iran (Benda et al. 1999b)

Digestive tracts of the specimens of *M. capaccinii* collected in Syria were unfortunately empty. The only result is available from an analysis of three fecal pellets obtained from one specimen at Abu Kamal. It contained the following volumes of four prey categories: 30% of Lepidoptera, 16.7% of Brachycera, 6.6% of Trichoptera, and 46.7% of Formicoidea. Our results did not prove piscivory in *M. capaccinii*.

Parasites. Diptera: Nycteribiidae: *Nycteribia pedicularia* Latreille, 1805: 'Cater Magara, mittleres Euphrattal' (Walter & Ebenau 1997).

Eptesicus serotinus (Schreber, 1774)

Records. **Original data**: Al Lathiqiyeh: Hayalien [1], above a temporary water pit, 1 June 2001: net. 3 ma; – Slinfeh [2], above a temporary water pit, 29 June 1998: net. 2 ma; 2 May 2001: det. several inds. – Deir ez Zur: As Salihiyyah [3], ruins of ancient Dura Europos, 19 April 2001: 6 inds. from *Tyto alba* pellets; – Halabiyyeh [4], ruins of ancient fortress town, 15 April 2001: 1 ind. from *Tyto alba* pellets. – Dimashq: Maalula [5], cave, 30 April 2001: net. 4 ma. – Tartus: Safita [6], fortress church, 30 May 2001: obs. colony of ca. 35 ad inds.; – Safita, above a river ca. 5 km to SE [7], 29 May 2001: net. 1 faL. – Quneitra / Golan Heights: Ya'ar Oden forest [8], 17 July 1999: det. 1 ind. – **Published data**: Raqqa: Cater (= Qatr) Magara cave [9], 1994: net. 2 inds. (Ebenau 1994, 1996). – Quneitra / Golan Heights: Mount Hermon and Golan, four unidentified records mapped in northern and central parts of this region [roughly the areas of Mount Hermon, Mas'adah, Baniyas and Katsrin], Mount Hermon, September 1994, males, 19–20 June 1995, several specimens netted; Golan Heights, 22 June 1995, two caves with colonies of nursing females, September 1995: a colony of several hundreds of inds. (Mendelssohn & Yom-Tov 1999).

Distribution. **General**. In the traditional view, *Eptesicus serotinus* is a South Palaearctic faunal element with broad distribution in the temperate zone of the Palaearctic from central Iberia, southern Great Britain and southernmost Scandinavia, over most of Europe, the northern Mediterranean (incl. some islands), Transcaucasia, the Near East to Central Asia (Corbet 1978, Bates & Harrison 1997, Horáček et al. 2000, Baagøe 2001). The morphologically very similar form present in North America, which was formerly included in its species rank (see e.g. Koopman 1994, Ferguson 2002), represents a distinct species, *E. fuscus* (Hoofer & Van Den Bussche 2003). Separate positions should be probably also defined for the populations of North Africa and the Oriental Region (cf. e.g. Benda et al. 2004d).

Near East. *E. serotinus* occurs in almost the whole Near East with the only exception of southern desert regions. In the Near East, it reaches southern margin of its distribution range both in Palestine and southern Iran. Records of this species cover almost the whole territory of Turkey, both in Mediterranean and steppe arid regions (Danford & Alston 1877, Satunin 1913, Çağlar 1965, Corbet & Morris 1967, von Helversen 1989, Ibáñez & Fernández 1989, Albayrak 1990a, 1993a, Obuch 1994, Spitzenberger 1994, Steiner & Gaisler 1994, Benda & Horáček 1998, Aşan 2001, Yiğit et al. 2006, our unpubl. data).

At least two accurate record sites of *E. serotinus* are known from Lebanon. Tristram (1884) mentioned its occurrence 'in Lebanon' (= the Lebanon Mts) and Allen (1915) found it in Shtora (= Chitaura, Bekaa Valley). Lewis & Harrison (1962) and Tohmé & Tohmé (1985) reported on the records of *E. serotinus* in Beirut. In Palestine, the species has been recorded only occasionally in the northern part of the country, in Tel Aviv, Jerusalem and in the Wadi Amud (Nahal 'Ammud) (Bodenheimer 1958, Harrison 1963c, 1964a, Makin 1987, Mendelssohn & Yom-Tov 1999). This species remains unknown in Jordan (Amr 2000, Amr et al. 2004) and Iraq (Harrison & Bates 1991).

In Iran, *E. serotinus* inhabits two separate regions according to the available records (DeBlase 1980). It lives in mountains along the whole northern border of the country (Harrison 1963b, Etemad 1967, Lay 1967, DeBlase 1980, our unpubl. data). A few records come from the southernmost part of the Zagros Mts (Dobson 1871, Lay 1967, our unpubl. data).

Two records of *E. serotinus* are available from Cyprus (Spitzenberger 1979, our data).

Syria (Fig. 84). *E. serotinus* is a medium-frequent bat in Syria, 13 records are known (Table 1). This species occurs in two different regions of the country. The most of its findings have been made in the Mediterranean woodland zone; four records come from the Jebel An Nusariyah Mts [1, 2, 6, 7], five records from the Anti-Lebanon Mts (incl. Mount Hermon) [5, 8], and several records

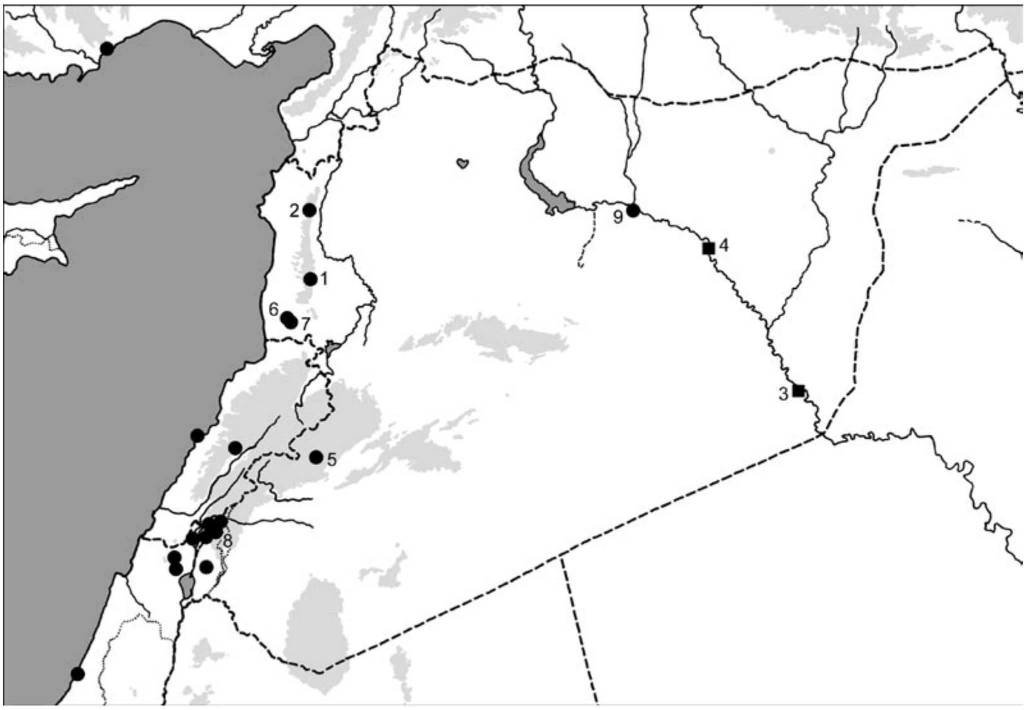

Fig. 84. Records of *Eptesicus serotinus* (Schreber, 1774) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

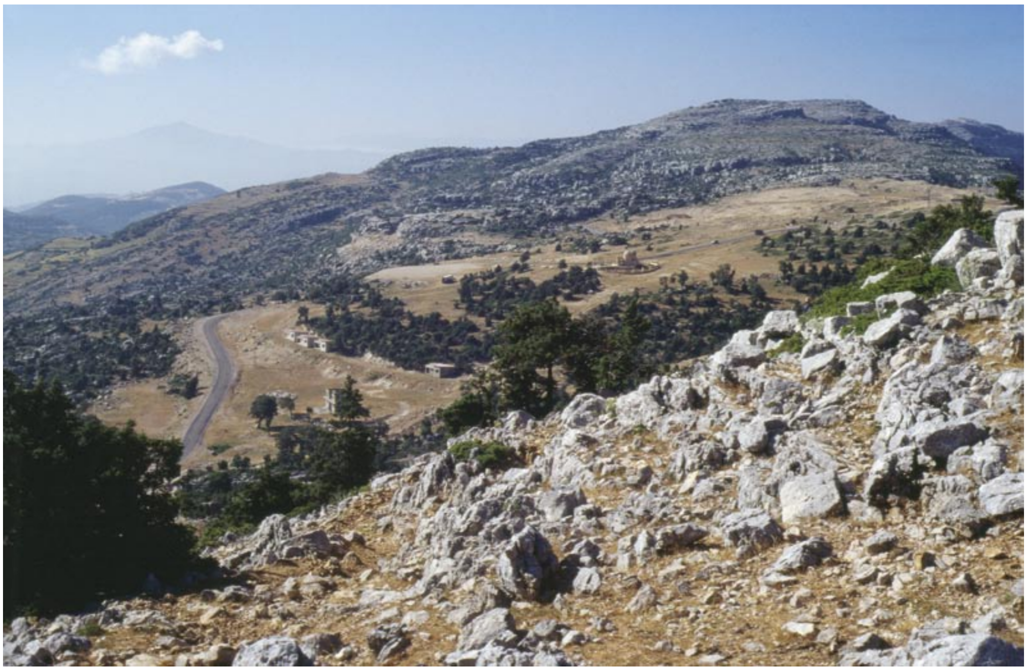

Fig. 85. Mountainous forested landscape of the Jebel An Nusariyah Mts at Slinfeh (1350 m a. s. l.), the area where four bat species were recorded (*Eptesicus serotinus*, *Hypsugo savii*, *Pipistrellus pipistrellus*, *Miniopterus schreibersii*) (photo by P. Benda).

from the Golan Heights (Mendelssohn & Yom-Tov 1999, our data). These records well connect known distribution of this species in the southern Levant (Harrison & Bates 1991).

The distribution of *E. serotinus* in the Euphrates Valley [3, 4, 9] (Ebenau 1994, our data) is a bit surprising, this basin is the only desert area inhabited by this species in the Near East. The occurrence in Syrian Mesopotamia is probably a range extent of the distribution in southeastern Turkey (Obuch 1994, Spitzenberger 1994, Benda & Horáček 1998).

FIELD NOTES. Only one roost of *Eptesicus serotinus* has been found in Syria; it was a fortress church in the city centre of Safita. A colony of ca. 35 individuals was observed in a ceiling fissure in the second floor hall of the approximate height of 5–6 m (in the same room but in a different crevice a colony of *N. noctula* was discovered). The rest of records of living individuals of *E. serotinus* in Syria were made by netting. Two males were caught above a pool (perhaps a temporary water source for livestock) at Slinfeh (Fig. 85). A female was netted above a river ca. 5 km to southeast of Safita. Three males were captured above a temporary water pit at Hayalien. Four males were netted at the entrance of a small cave in a cliff above Maalula (Fig. 86). Ebenau (1994, 1996) netted two individuals at the Qatr Magara cave (Fig. 18).

The sites of occurrence of *E. serotinus* in Syria lie at the altitudes from 210 m (Safita) to 1350 m (at Slinfeh), the mean altitude being 625.7 m. Besides its presence in the Euphrates valley, this species seems to represent a rather mountain element among Syrian bats.

Bat species associated with *E. serotinus* in Syria include *N. noctula* which was found in the same roost (see above), and the following species which were caught jointly during the netting sessions: *P. pipistrellus* and *H. savii* (at Slinfeh), *M. schreibersii*, *N. noctula* and *P. kuhlii* (at Safita), *H. savii* (at Hayalien), *H. savii*, *P. pipistrellus* and *P. macrobullaris* (Maalula), and *E. bottae*, *P. kuhlii* and *M. schreibersii* (Qatr Magara; Ebenau 1994, 1996).

The only signs of reproduction were recorded at Safita, where a lactating female was netted on 29 May 2001. This female perhaps came from the colony in Safita, some 5 km far from the netting place, discovered a day later (see above). Mendelssohn & Yom-Tov (1999) reported

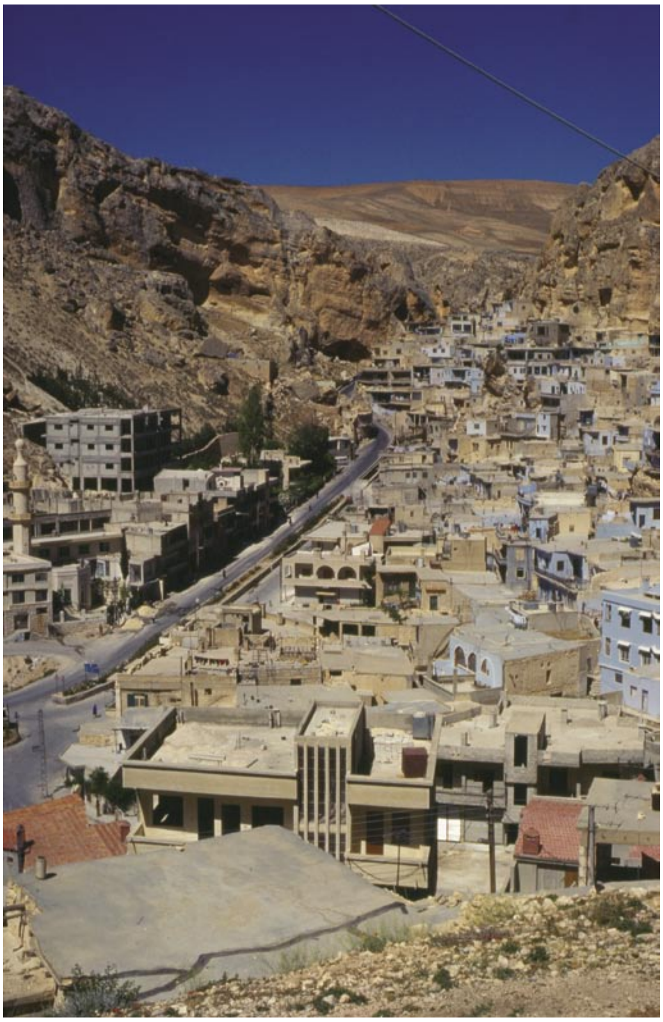

Fig. 86. Small town of Maalula, Anti-Lebanon Mts. At the entrance of a cave in the cliff above the town (on the left side of the picture), *Eptesicus serotinus*, *Hypsugo savii*, *Pipistrellus pipistrellus*, and *Plecotus macrobullaris* were netted. Echolocation calls of *Tadarida teniotis* were recorded in the town (photo by P. Benda).

Table 22. Basic biometric data on examined Syrian and comparative samples of *Eptesicus serotinus* (Schreber, 1774). For abbreviations see pp. 10, 11; T = type series

	Syria					Southern Turkey					S Iran (T *shiraziensis*)				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	11	**52.96**	50.1	55.2	1.764	9	**54.38**	50.5	55.9	1.959	1	**54.00**	–	–	–
LCr	11	**20.95**	19.95	21.98	0.611	9	**21.87**	21.08	22.47	0.460	2	**22.16**	22.02	22.30	0.198
LCb	11	**20.25**	19.27	21.08	0.543	9	**20.93**	20.08	21.70	0.528	2	**21.02**	20.55	21.48	0.658
LaZ	11	**14.30**	13.50	14.89	0.455	9	**14.91**	14.35	15.56	0.397	2	**14.98**	14.98	14.98	0.000
LaI	11	**4.32**	4.12	4.55	0.132	9	**4.22**	3.97	4.58	0.179	2	**4.39**	4.38	4.39	0.007
LaInf	11	**6.62**	6.12	7.02	0.229	9	**6.77**	6.37	6.95	0.195	1	**6.75**	–	–	–
LaN	11	**9.62**	9.28	10.04	0.222	9	**9.73**	9.45	10.20	0.264	2	**9.78**	9.74	9.82	0.057
LaM	11	**11.44**	11.18	11.76	0.191	9	**11.80**	11.52	12.02	0.187	2	**11.59**	11.48	11.69	0.148
ANc	11	**7.02**	6.42	7.34	0.257	9	**7.31**	6.94	7.82	0.285	2	**7.41**	7.14	7.67	0.375
ACr	11	**8.34**	8.02	8.63	0.181	9	**8.77**	8.22	9.20	0.280	2	**8.60**	8.46	8.74	0.198
CC	11	**6.78**	6.48	7.17	0.219	9	**7.05**	6.75	7.30	0.227	1	**7.31**	–	–	–
P^4P^4	11	**7.20**	6.97	7.67	0.206	9	**7.42**	7.00	7.75	0.248	1	**7.62**	–	–	–
M^3M^3	11	**8.71**	8.36	9.26	0.291	9	**8.88**	8.22	9.20	0.310	1	**9.02**	–	–	–
IM^3	11	**9.22**	8.74	9.61	0.284	9	**9.51**	9.28	9.83	0.169	2	**9.85**	9.75	9.95	0.141
CM^3	11	**7.85**	7.45	8.28	0.281	9	**8.07**	7.85	8.28	0.132	2	**8.50**	8.43	8.56	0.092
P^4M^3	11	**6.03**	5.74	6.41	0.224	9	**6.15**	5.98	6.37	0.117	2	**6.53**	6.45	6.61	0.113
M^1M^3	11	**4.86**	4.57	5.19	0.176	9	**5.00**	4.78	5.15	0.131	2	**5.24**	5.20	5.28	0.057
LMd	11	**15.65**	14.82	16.42	0.405	9	**16.23**	15.65	16.92	0.424	2	**16.75**	16.52	16.97	0.318
ACo	11	**5.85**	5.49	6.15	0.218	9	**6.19**	6.02	6.40	0.134	2	**6.38**	6.38	6.38	0.000
IM_3	11	**9.69**	9.31	10.17	0.271	9	**10.00**	9.87	10.20	0.092	2	**10.47**	10.38	10.56	0.127
CM_3	11	**8.71**	8.33	9.17	0.271	9	**8.97**	8.82	9.15	0.110	2	**9.38**	9.37	9.38	0.007
P_4M_3	11	**6.56**	6.21	6.94	0.232	9	**6.79**	6.52	7.00	0.164	2	**7.14**	6.97	7.31	0.240
M_1M_3	11	**5.51**	5.37	5.86	0.150	9	**5.69**	5.50	5.92	0.146	2	**5.88**	5.88	5.88	0.000
LaZ/LCb	11	**0.706**	0.680	0.739	0.016	9	**0.712**	0.683	0.731	0.016	2	**0.71**	0.70	0.73	0.022
M^3M^3/CM^3	11	**1.110**	1.061	1.176	0.034	9	**1.101**	1.037	1.172	0.039	1	**1.05**	–	–	–
CC/CM^3	11	**0.784**	0.000	0.886	0.260	9	**0.874**	0.837	0.926	0.030	1	**0.85**	–	–	–
CM^3/LCb	11	**0.388**	0.381	0.409	0.009	9	**0.386**	0.374	0.403	0.011	2	**0.40**	0.392	0.417	0.017
M^3M^3/LCb	11	**0.430**	0.416	0.458	0.014	9	**0.425**	0.391	0.442	0.018	1	**0.44**	–	–	–
LaM/LCb	11	**0.565**	0.551	0.582	0.012	9	**0.564**	0.554	0.581	0.009	2	**0.55**	0.544	0.559	0.010

findings made in the Golan Heights – a colony of several hundreds of individuals in September 1995, and two nursery colonies in caves on 22 June 1995. In Palestine, Harrison (1964a) found pregnant females carrying one embryo each in April and May. These data suggest occurrence of births in the Levant approximately in mid-May. It differs from the data from continental central and northern Turkey where births seem to occur in June (Aşan Baydemir & Albayrak 2006). Mendelssohn & Yom-Tov (1999) also reported records of males with large testes on Mount Hermon in June 1995 and September 1994.

E. serotinus was found in the diet of *Tyto alba* in the Euphrates valley of Syria, but it was not identified in the diet of other owls. Its remains represented 0.05 and 0.18% per sample of all prey items of the barn owl diet from Syria (and 0.06 and 0.22% of mammalian and 0.38 and 0.55% of bat items, respectively) analysed (Table 35). In the Middle East, remains of *E. serotinus* were found also in the diet of *Bubo bubo* in Turkey and Iran (Obuch 1994, unpubl.), of *Strix aluco* in Iran (Obuch unpubl.), and of *Athene noctua* in Iran (Obuch & Kristín 2004).

Material examined. 6 inds. (NMP 90371; 6 skulls, 6 pairs of mandibles, from owl pellets), As Salihiyyah, 19 April 2001, leg. J. Obuch; – 1 ind. (NMP 90372; rostrum and a pair of mandibles, from owl pellets), Halabiyyeh, 15 April 2001, leg. J. Obuch; – 3 ma (NMP 48924–48926 [S+A]), Hayalien, 1 June 2001, leg. P. Benda; – 4 ma (NMP 48985, 48986,

Table 22. (continued)

	Europe					Northern Caucasus				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	65	**51.69**	46.2	56.8	2.152	13	**52.71**	51.0	54.3	1.173
LCr	98	**20.48**	19.04	21.72	0.598	16	**20.83**	20.15	21.62	0.395
LCb	97	**19.65**	18.12	20.87	0.601	16	**20.07**	19.28	21.22	0.511
LaZ	95	**13.85**	12.74	14.85	0.409	16	**14.14**	13.42	14.63	0.336
LaI	100	**4.30**	3.92	4.75	0.168	16	**4.31**	4.09	4.54	0.125
LaInf	91	**6.41**	5.84	7.14	0.239	16	**6.59**	5.97	6.92	0.266
LaN	99	**9.47**	8.93	9.97	0.232	16	**9.47**	9.17	9.90	0.215
LaM	88	**10.96**	10.01	11.78	0.343	16	**11.13**	10.68	11.43	0.219
ANc	96	**6.52**	5.93	7.80	0.272	16	**6.73**	6.27	7.08	0.221
ACr	88	**7.90**	7.39	8.55	0.246	16	**8.21**	7.67	8.58	0.233
CC	100	**6.59**	6.12	7.17	0.218	16	**6.73**	6.33	7.00	0.201
P^4P^4	91	**7.08**	6.61	7.78	0.221	16	**7.20**	6.87	7.48	0.185
M^3M^3	100	**8.51**	7.93	9.32	0.250	16	**8.61**	8.22	8.85	0.201
IM^3	91	**8.99**	8.29	9.94	0.299	16	**9.19**	8.72	9.63	0.262
CM^3	100	**7.71**	7.06	8.52	0.255	16	**7.85**	7.40	8.27	0.257
P^4M^3	91	**5.93**	5.41	6.65	0.199	16	**6.02**	5.67	6.43	0.210
M^1M^3	91	**4.80**	4.46	5.31	0.143	16	**4.85**	4.58	5.13	0.161
LMd	99	**15.16**	14.13	16.35	0.477	16	**15.45**	14.83	16.25	0.421
ACo	97	**5.58**	4.62	6.41	0.287	16	**5.82**	5.53	6.32	0.213
IM_3	90	**9.51**	8.83	10.30	0.277	16	**9.63**	8.98	10.12	0.304
CM_3	99	**8.54**	7.71	9.68	0.304	16	**8.60**	8.02	9.03	0.284
P_4M_3	90	**6.46**	5.85	7.00	0.207	16	**6.52**	6.02	6.88	0.238
M_1M_3	90	**5.42**	4.97	5.86	0.166	16	**5.42**	5.12	5.72	0.158
LaZ/LCb	94	**0.704**	0.664	0.742	0.017	15	**0.704**	0.668	0.735	0.019
M^3M^3/CM^3	100	**1.105**	1.028	1.224	0.036	16	**1.097**	1.044	1.155	0.032
CC/CM^3	100	**0.855**	0.801	0.934	0.028	16	**0.858**	0.827	0.892	0.021
CM^3/LCb	98	**0.392**	0.373	0.411	0.008	16	**0.391**	0.381	0.404	0.007
M^3M^3/LCb	96	**0.433**	0.401	0.481	0.014	16	**0.429**	0.406	0.452	0.011
LaM/LCb	87	**0.558**	0.519	0.597	0.017	16	**0.554**	0.532	0.573	0.011

48988 [S+A], 48987 [S+B]), Maalula, 30 April 2001, leg. J. Obuch; – 1 fa (NMP 48875 [A]), Safita, 29 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 ma (NMP 48058, 48059 [S+A]), Slinfeh, 29 June 1998, leg. M. Andreas, P. Benda & M. Uhrin.

MORPHOLOGY. See Table 22 and Appendix III for biometric data on the Syrian specimens of *Eptesicus serotinus*. Skull and bacula from the specimens of *E. serotinus* collected in Syria are shown in Figs. 99 and 103. For comments see Taxonomy.

TAXONOMY. *Eptesicus serotinus* is considered a polytypic species with a number of subspecies (Ellerman & Morrison-Scott 1951, Gaisler 1970, Corbet 1978, Horáček et al. 2000, Baagøe 2001, Simmons 2005); viz. *E. s. serotinus* (Schreber, 1774) (terra typica: France); *E. s. isabellinus** (Temminck, 1840) (t.t.: environs de Tripoli, Afrique septentrionale [Libya]); *E. s. turcomanus* (Eversmann, 1840) (t.t.: between Caspian and Aral Seas, Turkestan [Uzbekistan / Kazakhstan]); *E. s. pachyomus* (Tomes, 1857) (t.t.: India [Rajputana]); *E. s. shiraziensis* (Dobson, 1871) (t.t.: Shiraz, 4,750 ft, SW Persia [Iran]); *E. s. andersoni* (Dobson, 1871) (t.t.: Momien, Yunnan, China); *E. s. boscai* (Cabrera, 1904) (t.t.: Muchamiel, Alicante, Spain); *E. s. pallens* Miller, 1911 (t.t.: Chengyuanhsien, 70 mi W of Chingyangfu, Kansu, China); *E. s. horikawai* Kishida, 1924 (t.t.:

Table 22. (continued)

	Transcaucasia					N Iran				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	35	**51.71**	48.1	55.0	1.606	1	**53.8**	–	–	–
LCr	39	**20.50**	19.53	21.62	0.510	4	**20.86**	20.27	21.37	0.471
LCb	37	**19.69**	18.87	20.48	0.429	4	**20.07**	19.75	20.58	0.384
LaZ	40	**13.95**	13.16	14.72	0.373	5	**14.29**	14.13	14.59	0.182
LaI	40	**4.29**	4.03	4.51	0.121	5	**4.31**	4.07	4.53	0.169
LaInf	40	**6.45**	6.07	6.96	0.227	5	**6.57**	6.19	6.88	0.274
LaN	40	**9.51**	9.03	10.03	0.227	4	**9.34**	9.04	9.62	0.244
LaM	38	**10.94**	10.28	11.64	0.310	4	**10.96**	10.55	11.53	0.422
ANc	37	**6.79**	6.34	7.27	0.239	4	**6.98**	6.58	7.17	0.271
ACr	38	**8.17**	7.74	8.67	0.238	2	**8.38**	8.12	8.64	0.368
CC	39	**6.63**	6.31	6.95	0.172	4	**6.64**	6.21	6.87	0.297
P^4P^4	39	**7.14**	6.76	7.66	0.209	4	**7.19**	6.75	7.44	0.302
M^3M^3	40	**8.47**	7.83	8.94	0.253	5	**8.68**	7.88	9.02	0.458
IM^3	40	**9.06**	8.53	9.48	0.217	5	**9.05**	8.84	9.50	0.260
CM^3	40	**7.71**	7.16	8.17	0.205	5	**7.82**	7.63	8.16	0.204
P^4M^3	40	**5.94**	5.58	6.38	0.187	5	**6.03**	5.82	6.24	0.157
M^1M^3	40	**4.81**	4.44	5.12	0.139	5	**4.89**	4.77	5.09	0.130
LMd	40	**15.21**	14.57	15.97	0.355	5	**15.52**	15.28	15.92	0.253
ACo	40	**5.59**	5.22	6.03	0.191	5	**5.87**	5.53	6.18	0.281
IM_3	40	**9.52**	9.02	9.96	0.204	5	**9.70**	9.48	10.18	0.274
CM_3	40	**8.59**	8.20	9.52	0.256	5	**8.63**	8.42	8.91	0.197
P_4M_3	40	**6.48**	6.18	6.77	0.156	5	**6.60**	6.48	6.72	0.090
M_1M_3	40	**5.42**	5.12	6.74	0.246	5	**5.48**	5.35	5.77	0.167
LaZ/LCb	37	**0.71**	0.68	0.74	0.014	2	**0.72**	0.71	0.72	0.010
M^3M^3/CM^3	40	**1.10**	1.03	1.22	0.036	5	**1.11**	1.03	1.15	0.049
CC/CM^3	39	**0.86**	0.81	0.91	0.022	4	**0.85**	0.81	0.88	0.029
CM^3/LCb	37	**0.39**	0.38	0.40	0.006	4	**0.39**	0.38	0.40	0.009
M^3M^3/LCb	37	**0.43**	0.41	0.46	0.013	4	**0.43**	0.39	0.46	0.028
LaM/LCb	36	**0.56**	0.53	0.58	0.010	4	**0.55**	0.52	0.56	0.017

Formosa); *E. s. intermedius* Ognev, 1927 (t.t.: Terek region, Murtasovo station, near Vladikavkaz, Russia); and *E. s. pashtonus* Gaisler, 1970 (t.t: Jalalabad, Afghanistan). However, some of these names, like *shiraziensis*, *boscai*, *intermedius*, and/or *pashtonus*, are considered to be synonymous with other names by several authors.

The populations of *E. serotinus* from the Middle East and the Caucasus region have been assigned to 2–5 forms (*serotinus*, *isabellinus*, *turcomanus*, *shiraziensis*, *intermedius*), see the review below. Another two names (*pachyomus* and *mirza*) were mentioned by Trouessart (1897) from Asia Minor and Persia, however these names were regarded invalid for the Middle East by subsequent authors. *E. s. pachyomus* is a valid subspecies name for populations inhabiting India

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* Note. Miller (1912) and some subsequent authors (e.g. Ellerman & Morrison-Scott 1951, Bauer 1956a, Corbet 1978, Baagøe 2001) mentioned the name *Vespertilio isabellinus* Cabrera, 1904, and suggested it to be a synonym of the nominotypical form of *E. serotinus* (Schreber, 1774). However, Cabrera (1904) described only two new taxa from the rank of the current *E. serotinus* group, viz. *Vespertilio serotinus insullaris* from Menorca and *Vespertilio Boscai* from Spain. The name *Vespertilio isabellinus* was mentioned by Cabrera solely in connection with Temminck, the author of the name (Cabrera 1904: 264), i.e. he exactly referred to the description *Vespertilio isabellinus* Temminck, 1840. The name *Vespertilio isabellinus* was not proposed as a new name by Cabrera (1904), although later Cabrera himself accepted the Miller's (1912) opinion (see Cabrera 1914: 130), and the name *Vespertilio isabellinus* Cabrera noted by Miller (1912) and later authors is not a synonym nor a junior homonym of that by Temminck (1840).

Table 22. (continued)

	Maghreb & Tripolitania					E Central Asia					SW Turkmenistan				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	40	**48.68**	45.1	51.8	1.808	24	**50.01**	46.7	54.2	1.930	14	**50.81**	47.20	55.00	1.979
LCr	40	**19.10**	17.86	20.51	0.549	27	**19.70**	18.52	21.08	0.593	16	**19.95**	19.44	20.53	0.337
LCb	40	**18.72**	17.61	20.02	0.521	24	**19.19**	18.22	20.34	0.540	16	**19.50**	18.73	20.13	0.360
LaZ	37	**13.48**	12.18	14.42	0.523	27	**12.99**	11.47	14.04	0.579	16	**13.32**	12.17	13.95	0.418
LaI	40	**4.29**	3.92	4.58	0.171	27	**4.22**	3.92	4.52	0.172	16	**4.29**	3.95	4.62	0.164
LaInf	39	**6.36**	5.81	6.88	0.259	27	**6.33**	5.67	6.89	0.295	16	**6.40**	6.07	6.97	0.240
LaN	40	**9.01**	8.18	9.67	0.306	27	**9.03**	8.08	9.64	0.360	16	**9.06**	8.63	9.33	0.177
LaM	40	**10.84**	10.03	11.34	0.362	26	**10.29**	9.28	10.76	0.413	16	**10.46**	9.92	10.93	0.262
ANc	40	**6.45**	5.91	7.08	0.282	24	**6.36**	5.55	6.90	0.342	16	**6.42**	5.95	6.72	0.235
ACr	40	**8.04**	7.52	8.65	0.301	25	**7.69**	7.07	8.52	0.309	15	**8.04**	7.68	8.40	0.231
CC	39	**6.25**	5.68	6.83	0.272	27	**6.22**	5.53	7.08	0.319	16	**6.39**	6.00	6.72	0.191
P^4P^4	38	**6.80**	6.38	7.36	0.254	27	**6.90**	6.12	7.66	0.316	16	**6.98**	6.65	7.40	0.232
M^3M^3	38	**8.26**	7.56	8.94	0.315	27	**8.15**	7.47	8.81	0.336	16	**8.34**	7.86	8.86	0.270
IM^3	39	**8.40**	7.85	9.18	0.307	27	**8.70**	8.20	9.58	0.273	16	**8.83**	8.18	9.11	0.229
CM^3	40	**7.15**	6.68	7.74	0.254	27	**7.45**	7.02	8.11	0.197	16	**7.52**	7.13	7.73	0.166
P^4M^3	40	**5.61**	5.22	6.12	0.186	27	**5.83**	5.61	6.32	0.153	16	**5.90**	5.43	6.18	0.172
M^1M^3	40	**4.54**	4.24	4.91	0.139	27	**4.61**	4.39	5.13	0.151	16	**4.65**	4.28	4.92	0.179
LMd	39	**14.28**	13.42	15.12	0.395	26	**14.51**	14.00	15.19	0.346	16	**14.66**	13.67	15.25	0.352
ACo	40	**5.29**	4.98	5.68	0.197	26	**5.24**	4.73	5.82	0.295	16	**5.50**	5.07	5.80	0.244
IM_3	39	**8.79**	8.27	9.52	0.292	26	**9.05**	8.62	9.79	0.254	16	**9.13**	8.67	9.38	0.182
CM_3	40	**7.86**	6.94	8.49	0.314	26	**8.14**	7.56	8.88	0.237	16	**8.22**	7.83	8.45	0.196
P_4M_3	40	**6.08**	5.48	6.58	0.224	26	**6.27**	5.88	6.80	0.196	16	**6.33**	6.02	6.48	0.135
M_1M_3	40	**5.15**	4.48	5.54	0.215	26	**5.24**	4.92	5.68	0.174	16	**5.25**	4.93	5.52	0.160
LaZ/LCb	37	**0.719**	0.665	0.755	0.018	24	**0.678**	0.630	0.716	0.023	16	**0.683**	0.650	0.707	0.017
M^3M^3/CM^3	38	**1.154**	1.112	1.210	0.028	27	**1.094**	1.000	1.155	0.033	16	**1.109**	1.048	1.157	0.031
CC/CM^3	39	**0.873**	0.809	0.929	0.027	27	**0.834**	0.763	0.885	0.030	16	**0.849**	0.822	0.882	0.019
CM^3/LCb	40	**0.382**	0.364	0.403	0.009	24	**0.389**	0.367	0.402	0.009	16	**0.386**	0.370	0.392	0.005
M^3M^3/LCb	38	**0.441**	0.419	0.468	0.010	24	**0.426**	0.402	0.456	0.015	16	**0.428**	0.407	0.444	0.011
LaM/LCb	40	**0.579**	0.547	0.611	0.015	23	**0.538**	0.509	0.565	0.015	16	**0.537**	0.522	0.553	0.009

and Pakistan (Ellerman & Morrison-Scott 1951, Gaisler 1970, Corbet 1978, Corbet & Hill 1992, Bates & Harrison 1997). The name *Vespertilio mirza* de Filippi, 1865 (t.t.: Persia [Zanjan or Qazvin, N Iran; sensu DeBlase 1980]) was considered a possible synonym of the Central Asian subspecies *E. s. turcomanus* by Ellerman & Morrison-Scott (1951), but DeBlase (1980) showed it to be a synonym of *E. s. serotinus*.

Traditionally, in the western part of the Near East and in the Levant, only the nominotypical form was noticed (Bodenheimer 1958, Lewis & Harrison 1962, Harrison 1964a, Atallah 1977, Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999, Ferguson 2002), but also a mention of *E. s. isabellinus* appeared (Qumsiyeh 1996).

Gaisler (1970) was the first to analyse the populations of *E. serotinus* in almost its whole distribution range, including the Middle East. In this region he recognised two subspecies, based mainly on their coloration; *E. s. serotinus* (incl. *intermedius*) in Asia Minor, the Levant, and in the Caucasus region, but with 'eastern limit unknown', extralimitally also in the European range; *E. s. turcomanus* (incl. *shiraziensis*) in 'whole Iran and, very likely, northern Iraq' and extralimitally in Central Asia and northern Afghanistan. He mentioned another subspecies, *E. s. isabellinus*, occuring in northern Africa but with an unknown exact range; thus, it should theoretically stretch also to the Middle East. Besides these three forms, Gaisler (1970) distinguished four additional

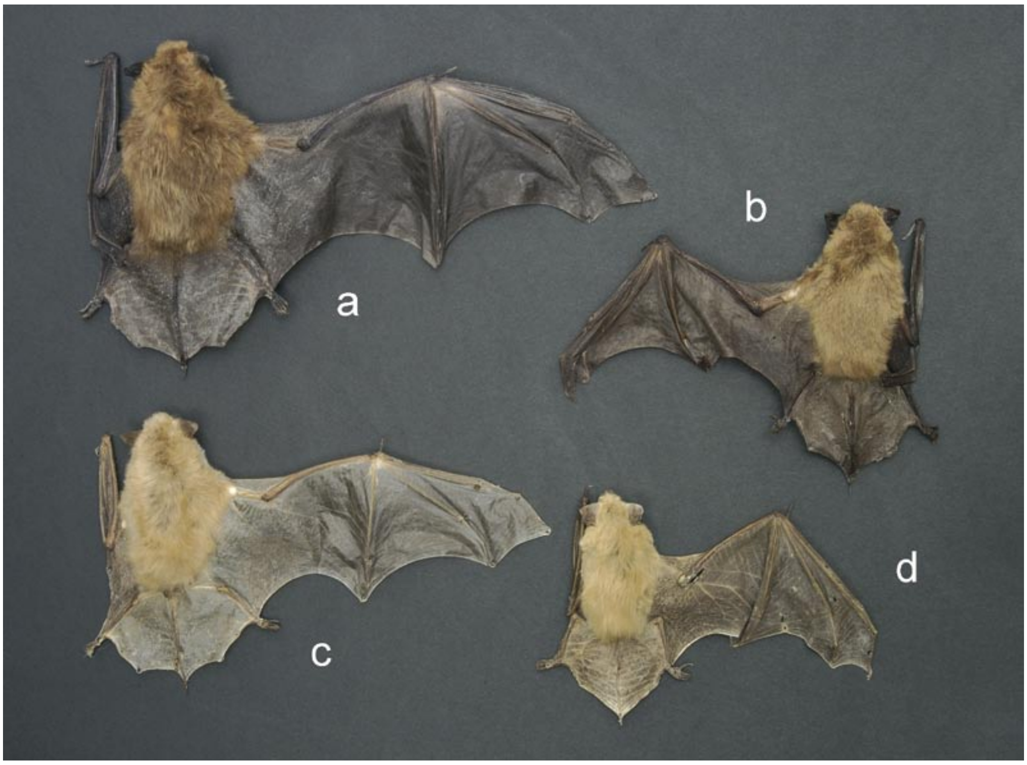

Fig. 87. Pelage coloration in the genus *Eptesicus* Rafinesque, 1820 (above – dorsal views, below – ventral views): a – *E. serotinus* (Schreber, 1774) (male, NMP 48987, Syria, Maalula), b – *E. anatolicus* Felten, 1971 (male, NMP 48918, Syria, Qala'at al Marqab), c – *E. bottae hingstoni* Thomas, 1919 (male, NMP 48973, Syria, As Salihiyyah), d – *E. bottae ognevi* Bobrinskoj, 1918 (male, NMP 91337, Azerbaijan, Gobustan). Part I. Dorsal aspect.

subspecies of *E. serotinus* (*pachyomus*, *andersoni*, *pallens*, *pashtonus*) and discussed a possible subspecies status of one more form (*boscai*).

DeBlase (1980) mostly accepted Gaisler's (1970) opinion but regarded the form *shiraziensis* as a separate subspecies, being much bigger than *E. s. turcomanus*, however, of similar but not identical coloration. Moreover, he pointed out that only two specimens of *E. s. shiraziensis* were known as the other Gaisler's individuals of '*shiraziensis*' were in fact *E.* (*bottae*) *anatolicus*. According to DeBlase's (1980) review, in Iran, the medium-sized dark *E. s. serotinus* occurs in the Talysh and Elborz Mts, the small-sized pale *E. s. turcomanus* in the northeastern corner of the country, and the large-sized pale *E. s. shiraziensis* in the Zagros Mts of southwestern Iran (Fars Province).

In the western part of the Near East (Anatolia), Spitzenberger (1994) distinguished two morphotypes of *E. serotinus* with separate ranges. The nominotypical subspecies occurs in northern Anatolia, where its western part of distribution in the Balkans is connected with the eastern part in the Caucasus and northern Iran (see also Albayrak 1990a and Steiner & Gaisler 1994). In southern Anatolia, Spitzenberger (1994) discovered a distinct population of *E. serotinus* which in skull size reaches the largest known Palaearctic form, *E. s. shiraziensis*, but differs from all other subspecies by its coloration (pale pelage vs. blackish face, ears and membranes).

In conclusion, the synthesis of the above opinions shows up to five morphotypes to be present in the Near East. The small form with pale 'sandy' pelage and pale brown skin of the face, ears and wing membranes inhabits the northeastern part of the region which it reaches the Central Asian deserts; this form is co-identified with *E. s. turcomanus* (Gaisler 1970, DeBlase 1980, etc.). The medium-sized form with brown pelage (from pale rusty-brown to dark chestnut brown) and dark brown to blackish naked parts occurs in the northern part of the Near East, in the northern part of Anatolia, the Caucasus region and mountains in northern Iran; this form is co-identified with *E. s. serotinus* (Harrison 1963b, Gaisler 1970, DeBlase 1980, Rakhmatulina 1988, 1995, Spitzenberger 1994, Steiner & Gaisler 1994).

The southern part of the Near East is inhabited by several colour phases. In Lebanon and northern Palestine, a population of darker individuals was found which was also assigned to the nominotypical subspecies by Lewis & Harrison (1962), Harrison (1964a), Atallah (1977), Harrison & Bates (1991), Mendelssohn & Yom-Tov (1999), and Ferguson (2002). A population of large individuals with pale pelage and pale face, ears and wing membranes lives in southwestern Iran (*E. s. shiraziensis*, see DeBlase 1980), while in southwestern Anatolia, a similarly large-sized population with pale fur but with blackish naked parts was found (not formally described taxon,

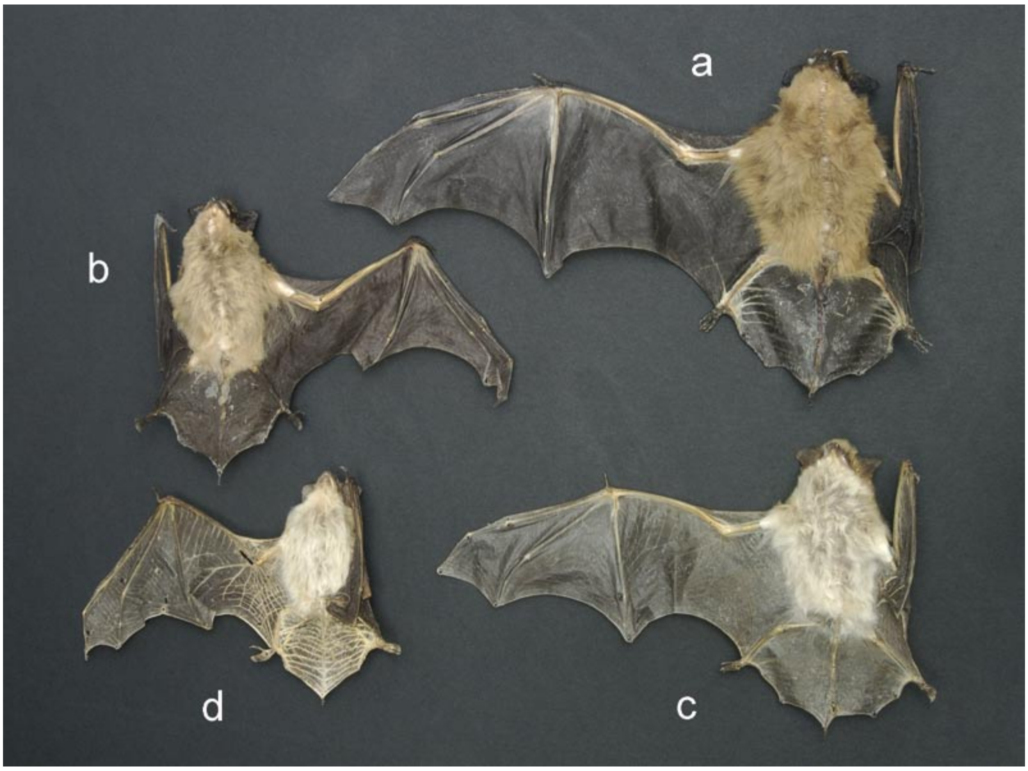

Fig. 87. (continued) Part II. Ventral aspect

see Spitzenberger 1994). The Syrian area inhabited by *E. serotinus* lies between the ranges of the three latter populations.

The Syrian population of *E. serotinus* consists of rather light brown individuals with dark brown face, ears and wing membranes (Fig. 87). Their dorsal pelage is brown, paler than in European individuals but markedly darker than is the 'sandy' beige of the desert forms (*E. s. turcomanus*, *E. s. isabellinus* and/or *E. b. hingstoni*, *E. b. ognevi*, etc.); in tinge it resembles the colour of the form *anatolicus* but a bit darker. The ventral side is pale brown or beige. Both dorsal and ventral hairs are bi-coloured. Basal parts of the dorsal hairs (ca. $^1/_2$ of hair length) are brown, distal parts being pale brown with goldy tinge (but the difference between the two parts is rather small). Basal parts of ventral hairs (ca. $^1/_2$ of hair length) are beige, distal parts are only slightly paler, beige to yellowish-beige. In short, the coloration of the Syrian representatives of *E. serotinus* is a transition between 'sandy' pale coloration of *E. s. turcomanus* or *E. s. isabellinus* and dark brown coloration of *E. s. serotinus* from Europe or northern Anatolia.

However, in several populations, more colour phases were reported to occur in sympatry, mainly on the margins of arid regions. Strelkov et al. (1978) found both dark and pale individuals as well as intermediate coloured bats to be commonly present in the foothills of the Kopetdag Mts in southwestern Turkmenistan. Strelkov et al. (1978) interpreted these findings as hybrids between the nominotypical form and *E. s. turcomanus*, however, based on their dimensions, these bats represent the Central Asian subspecies (Table 22). Similarly, Strelkov & Il'in (1990) noticed the zone of transition between the European *E. s. serotinus* and the Central Asian *E. s. turcomanus* in the lower Volga river region, findings of several colour phases creating a continuum between both subspecies, including the typical coloration morphs as extremes. The NMP collection contains a series of 35 specimens of *E. serotinus* from eastern Azerbaijan, which shows several morphs of pelage coloration from pale brown to rusty brown, but never dark chocolate brown which is also present in European samples. Finally, as reviewed above, in the western part of the Near East several colour morphs of *E. serotinus* are also present (Harrison 1964a, Spitzenberger 1994, our records), however, they have never been found in clear sympatry.

Thus, we consider the applicability of coloration to a reliable taxonomic conclusion within *E. serotinus* rather uncertain, particularly in the region, where records are quite scarce and conclusions have been made on a basis of only several examined specimens per population from limited occurrence spots. Although we also noted the coloration traits as a substantial characters of the Mediterranean and the Middle Eastern populations, we further assess mainly the morphological and metric ones.

A comparison of skull measurements (Table 22, Fig. 88) of western Palaearctic populations of *E. serotinus* placed the Syrian samples on the upper margin of the variation range of European samples, which overlaps with the range of southern Turkish and southwestern Iran samples. This comparison conforms with the previous analyses (Gaisler 1970, DeBlase 1980, Spitzenberger 1994) and clusters Caucasian, Transcaucasian, northern Turkish and northern Iran individuals into a similar variation range as the European samples, thus suggesting their assignation to one form. Two most distinct populations appear within the whole compared material: (1) the samples of *E. s. isabellinus* from the Maghreb and *E. s. turcomanus* from Central Asia, being on average significantly smaller than the nominotypical form from Europe and the Caucasus region, and (2) on the other variation margin, the samples of *E. s. shiraziensis* from southwestern Iran and the unnamed form from southwestern Anatolia, which are on average much larger than the nominotypical form. The Syrian samples create a transition between medium-sized nominotypical bats and large Turkish and Iran individuals. A comparison of skull width measurements as well as the skull width/length ratios shows clear differences between the samples of *isabellinus* and *turcomanus* (Table 22, Fig. 89); *E. s. isabellinus* has a relatively very broad skull, while that of *E. s.*

turcomanus is relatively extremely narrow, and, both these samples show on average a relatively short rostral part of the skull. All other examined samples have very similar skull width/length ratios, with values lying in between the above two extreme populations, however, they have a relatively slightly longer rostrum (Fig. 89, Table 22: LaZ/LCb, LaM/LCb, CM^3/LCb). In this comparison, the Syrian and other Middle Eastern populations showed similar average values as the nominotypical samples (both from the Caucasus and from Europe).

The principal component analysis of the skull dimensions and indexes (mandible measurements omitted) showed similar results as their univariate and bivariate comparisons. This analysis selected 16 dimensions as highly significant for the discrimination of clusters within all compared samples; they included almost all skull measurements taken (with the exception of LaI, ANc, and ACr), all the taken tooth-row dimensions and three indexes (LaZ/LCb, M^3M^3/CM^3, LaM/LCb) (Fig. 90; PC1=59.67%, PC2=19.49% of variance). The PC analysis divided compared samples into four highly overlapping clusters; viz. *E. s. serotinus* (both from Europe and Caucasus region), *E. s. turcomanus*, *E. s. isabellinus*, and southern Anatolian samples. The small sample of *E. s. shiraziensis* clusters as the only distinct sample without overlap. Similarly as in the previous comparisons, the Syrian populations cluster together with the nominotypical and southern Turkish samples.

A comparison of some baculum preparations does not show any remarkable difference. Bacula of the Syrian bats well resemble in their shape and size those of other *E. serotinus* samples throughout the species range (Fig. 99), see also Topál (1958) and Hill & Harrison (1987). Similar results were reported by Strelkov (1989b) who compared European and Caucasian *E. s. serotinus*

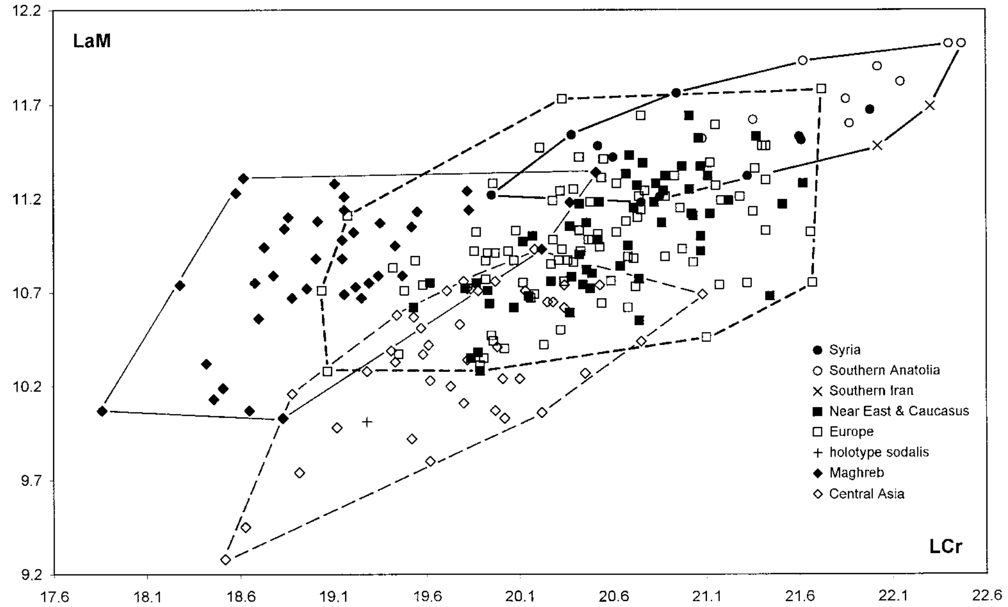

Fig. 88. Bivariate plot of examined Syrian and comparative samples of *Eptesicus serotinus* (Schreber, 1774): greatest length of skull (LCr) against the mastoidal width of skull (LaM). Explanation: bold-lined polygon = samples of Syria, Lebanon, southern Turkey and southern Iran (n=22), i.e. *E. serotinus shiraziensis* (Dobson, 1871); thin-lined polygon = Maghrebian samples (n=40), i.e. *E. s. isabellinus* (Temminck, 1840); bold-dashed polygon = samples of Europe and northern part of the Near East, incl. the Caucasus (n=142), i.e. *E. s. serotinus* (Schreber, 1774); thin-dashed polygon = Central Asian samples (n=43), i.e. *E. s. turcomanus* (Eversmann, 1840).

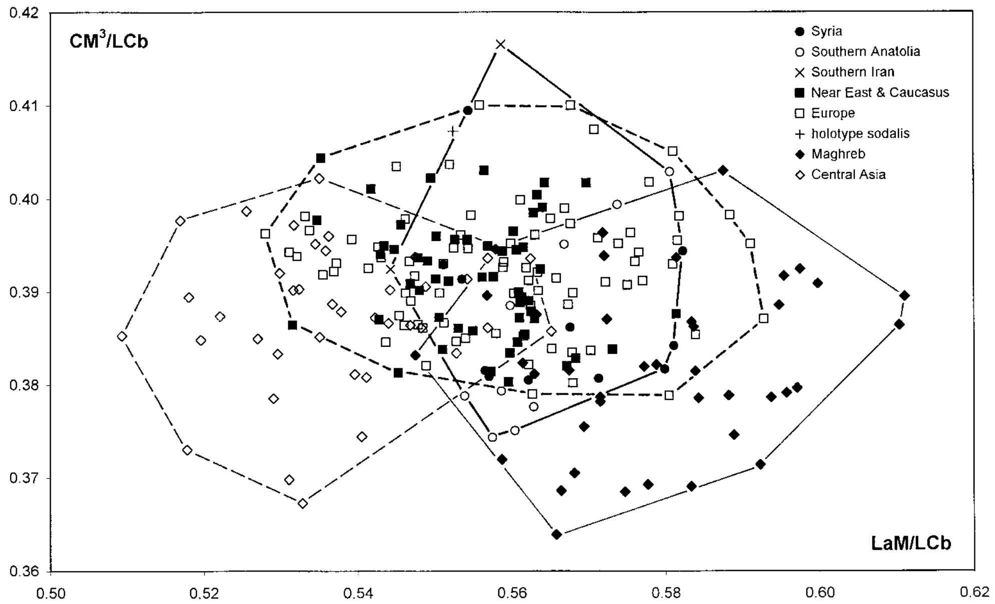

Fig. 89. Bivariate plot of examined Syrian and comparative samples of *Eptesicus serotinus* (Schreber, 1774): relative width of the braincase (LaM/LCb) against the relative length of rostrum (CM^3/LCb). For explanation see Fig. 88.

and Central Asian *E. s. turcomanus*; he found only size differences in bacula, but these differences are present also in sole comparison of body size of these bats (see above).

We can conclude that the geographic variation in *E. serotinus* is rather moderate. Some differences between particular populations are present in the size of body and skull, in skull shape and in coloration of the pelage and naked parts of skin. However, all these characters broadly overlap and/or alternate throughout the range. As a tentative division of the western Palaearctic populations of *E. serotinus*, based on the above comparison and with respect to the geographical proximity of the respective populations and their characters, we suggest the following arrangement of allopatric forms (including a tentative name assignation):

E. s. serotinus: medium-sized form, skull with a relatively long rostrum, pelage coloration pale brown to dark brown, in more arid areas paler, naked parts dark brown to black; distribution: European part of the species range, incl. the Caucasus region, northern parts of the Near East from Pontus to the Kopetdag Mts.

E. s. isabellinus: smaller form, skull relatively broad with a relatively short rostrum, pelage coloration tawny or yellowish buffy, naked parts dark brown to black; distribution: southwestern Mediterranean part of the species range, from the Canary Islands and western Morocco to Tripolitania, Libya.

E. s. turcomanus: smaller form, skull relatively narrow with a relatively short rostrum, pelage coloration buffy to beige, naked parts pale brown, (perhaps) in more humid habitats darker; distribution: Central Asia, easternmost parts of Europe (the Volga Basin).

E. s. shiraziensis: large to very large form, skull with a relatively long rostrum, pelage coloration varies from beige to pale brown, naked parts from pale brown to black; distribution: southern part of the Near East, from southwestern Anatolia and the Levant (incl. Syria) to southwestern Iran.

Although the forms *turcomanus* and *isabellinus* have been considered by most authors as two subspecies of *E. serotinus* (see Dobson 1878, Jentink 1888, Cabrera 1914, Ognev 1927, 1928, Kuzjakin 1934, 1950, 1965, Allen 1939, Ryberg 1947, Harrison 1963d, Strelkov 1963, 1981, 1989b, Hayman & Hill 1971, Corbet 1978, Butovskij et al. 1985, Pavlinov & Rossolimo 1987, Ruprecht 1990, Kowalski & Rzebik-Kowalska 1991, Strelkov & Il'in 1990, Bates & Harrison 1997, Horáček et al. 2000, Baagøe 2001), they represent the most derived and differing forms within its western Palaearctic range. Although a more separated position of both morphotypes is therefore possible (see e.g. Brandt 1851, Cabrera 1904, Thomas 1905, Bianki 1917, Bobrinskoy 1925, Ellerman & Morrison-Scott 1951, Wassif 1962, Palmeirim 1990), it can be proved only by a genetic analysis as the two forms live in allopatry or parapatry with the nominotypical one. (Similarly as in the case of *Eptesicus fuscus*, a North American species that was also formerly considered a subspecies of *E. serotinus*, comp. Koopman 1994 vs. Hoofer & Van Den Bussche 2003.)

However, the occurrence of the form *E. s. isabellinus* in the Levant as suggested by Qumsiyeh (1996) is quite improbable, as this subspecies occurs nearest to the Levant in Tripolitania, western Libya. The examined individuals from Syria and Lebanon are much bigger and have a different skull shape than the Maghrebian individuals of *E. s. isabellinus* (Table 22).

Although the Syrian and Lebanese samples of *E. serotinus* partly conform in size with the nominotypical ones (Fig. 88), the occurrence of *E. s. serotinus* in the southern Levant, as suggested by Bodenheimer (1958), Lewis & Harrison (1962), Harrison (1964a), Atallah (1977), Mendelssohn & Yom-Tov (1999) and Ferguson (2002), seems also unlikely mainly due to geographic reasons: the Levantine area is separated from the main range of *E. s. serotinus* by a strip of the Mediterranean zone in southern Turkey inhabited by large bats tentatively coidentified with *E. s. shiraziensis*

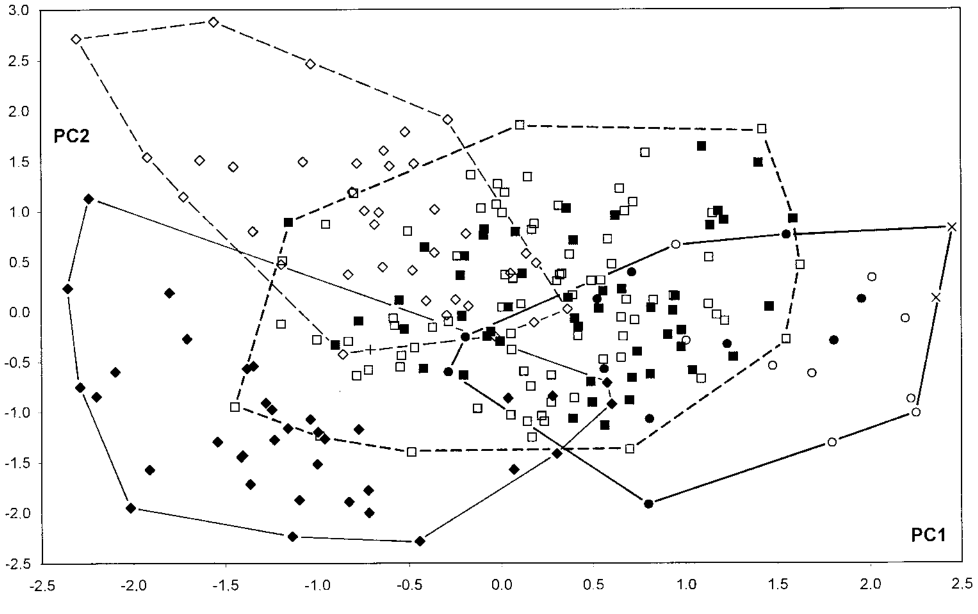

Fig. 90. Bivariate plot of examined Syrian and comparative samples of *Eptesicus serotinus* (Schreber, 1774): results of the principal component analysis of selected 16 skull dimensions (see text). For explanation see Fig. 88.

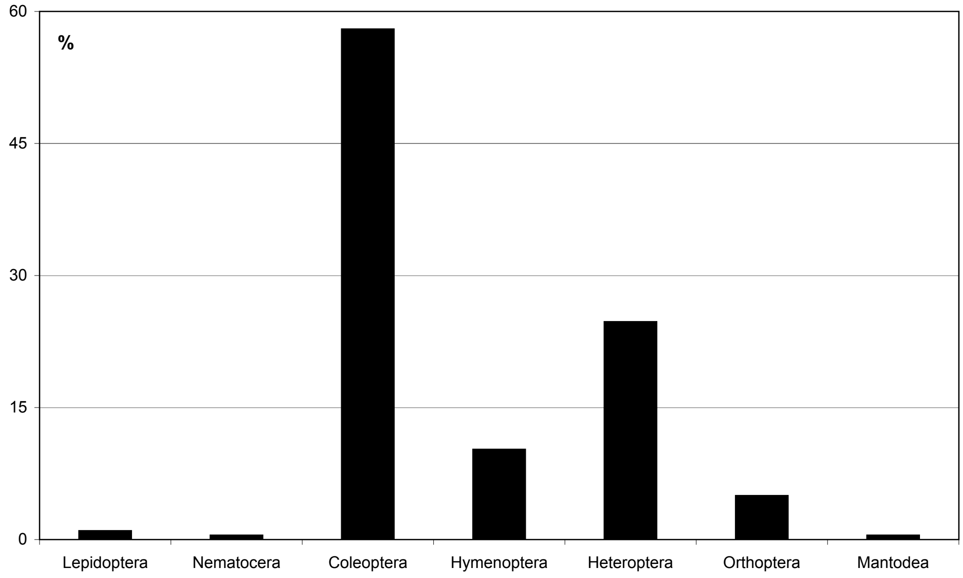

Fig. 91. Volume of particular food items in the diet of *Eptesicus serotinus* (Schreber, 1774) from Hayalien, Syria.

(Spitzenberger 1994, Benda & Horáček 1998). Thus, the Syrian populations seem to belong to the latter form as well.

FEEDING ECOLOGY. *Eptesicus serotinus* is a large bat species with a slow hawking foraging strategy, but some prey is supposed to be taken from the foliage and/or ground or hunted from a perch (Norberg & Rayner 1987, Catto et al. 1996). Coleoptera, Lepidoptera and Diptera (mostly Nematocera) are the most important diet items (Kurtze 1982, Catto et al. 1994, Beck 1995, Gajdošík & Gaisler 2004, Andreas 2002, Baagøe 2001, Rahmatulina 2005, etc.).

We analysed one faeces sample and several digestive tract contents from *E. serotinus* collected in Syria. In the sample of faeces coming from Hayalien, Coleoptera (mostly Scarabaeidae) and Heteroptera were the most abundant prey categories (Fig. 91). Similar results were obtained from the analysis of two digestive tracts collected near Slinfeh: Scarabaeidae (40% of volume), Heteroptera (25%), Formicoidea (15%), Auchenorrhyncha (10%), and Neuroptera (10%); and one digestive tract collected near Safita: Scarabaeidae (70%), Carabidae (10%) and Heteroptera (20%).

The main prey category of *E. serotinus* found in Syria was the same as in all previous studies – Coleoptera. The other food items may vary in volume of its representation, but Heteroptera often are the second most abundant food in the Middle Eastern habitats. Nematocera, a very frequent prey of *E. serotinus* in more humid and temperate regions (see the above authors), seem to be rare because of the absence of larger water bodies in the region.

Eptesicus bottae (Peters, 1869)

RECORDS. **Original data**: Deir ez Zur: As Salihiyyah [1], ruins of ancient Dura Europos, gallery, 18 June 1998: net. 1 faL; 18 April 2001: det. several inds.; 19 April 2001: 1 ind. from *Tyto alba* pellets; ruins of ancient Dura Europos, a fissure betw. stones, 16 May 2001: coll. 1 ma; – As Salihiyyah, valley 1.5 km NW of Dura Europos [2], cave, 20 April

2001: net. 2 ma; – Halabiyyeh [3], ruins of ancient fortress town, 14 May 2001: det. min. 5 inds.; – Sbeikhan [4], around caves, 15 May 2001: det. min 2 inds.; – Zalabiyyeh [5], rocks under ancient ruins, 15 April 2001: 1 ind. from *Tyto alba* pellet. – Halab: Balis [6], ruins of necropolis, 13 May 2001: coll. 1 ma. – Hassake: Khazneh [7], Jebel 'Abd al 'Aziz, cave, 17 May 2001: net. 1 ma, 1 faG. – Raqqa: Rasafah [8], ancient ruins, 16 June 1998: obs. min. 3 nurs. colonies (ca. 25+15+10 inds.), net. more than 50 inds. (coll. 6 mj, 4 faL, 1 fa, 2 fj); 13 April 2001: net. 1 ma, 5 faG; 13 May 2001: obs. nurs. colony of ca. 25 inds. (adult females and juveniles) and net. 10 faL (coll. 4 mj, 5 fa, 3 fj); Rasafah, ancient ruins, cistern, 16 June 1998: 5 inds. from *Tyto alba* pellets; 14 April 2001: 11 inds. from *Tyto alba* pellets. – **Published data**: Raqqa: Cater (= Qatr) Magara cave [9], 1993: 1 ind. (from osteological cave deposit), 1994: net. 4 inds. (Ebenau 1994, 1996); – Euphrates Valley cliffs near Qater Maghara (= Qatr Magara) [10], 19 March 1996: 1 ind. from *Tyto alba* pellet (Shehab et al. 2004).

DISTRIBUTION. **General**. *Eptesicus bottae* s.s. (i.e., without *E. anatolicus*, see below) is a desert species which inhabits arid areas of central and southwestern Asia with a minute reach to the African continent; its known distribution range comprises several isolated areas (Nader & Kock 1990b, our data). This bat inhabits, from the west to the east, Cairo and surroundings, the deserts of southern Palestine and Jordan, southwestern Arabia (Yemen and Saudi Arabia), eastern Oman, Mesopotamia of Syria and Iraq, Transcaucasia, northwestern Iran, entire Central Asia from western Kazakhstan and Turkmenistan to eastern Kazakhstan and Kashmir*, and Persian Baluchestan. (For distribution of *E. anatolicus* see below.)

Near East (Fig. 92). *E. bottae* s.s. occurs in three separated areas in the Near East; along the Rift Valley of southern Palestine and Jordan, in Mesopotamia from central Syria to southern Iraq, and in northwestern Iran and Transcaucasia (Nader & Kock 1990b). These main areas are distinctly geographically separated. No records of *E. bottae* are available from Turkey and Lebanon, although its occurrence in the former country is most presumable (Benda & Horáček 1998).

In Palestine, *E. bottae* occurs in the deserts of the Rift to the south from En Gedi (western bank of the Dead Sea); in the Arava Valley and in the Judean and eastern Negev Deserts (Harrison 1963c, Makin 1976, 1977, Yom-Tov et al. 1992a, Mendelssohn & Yom-Tov 1999, Korine & Pinshow 2004). Four records of this bat come from the southwestern parts of Jordan, adjacent to the Wadi Araba and Dead Sea (Bates & Harrison 1989, Qumsiyeh et al. 1992, Disi & Hatough-Bouran 1999, Al-Omari et al. 2000, Amr 2000, our unpubl. data).

E. bottae is a common bat in Mesopotamia; in Iraq this bat was first mentioned by Fitzinger (1870b), and later by many other authors, although often under different names (see Fitzinger 1870b, and Nader & Kock 1990b for the names used). Findings of the species are available from the basins of the Euphrates (Fitzinger 1870b, von Wettstein 1913, Sanborn 1940, Harrison 1956b,

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* NOTE. Nader & Kock (1990b) doubted the occurrence of *E. bottae* in Afghanistan. Two records assigned to this species had appeared in Afghanistan (see Nader & Kock 1990b for a thorough review); a mapping point by Kuzjakin (1950) from Fayzabad and a possible record by Meyer-Oehme (1965) from Kabul. The latter record was re-identified by Felten (1971) as of *Eptesicus nilssonii kashgaricus* Bobrinskoj, 1926 (= *E. gobiensis* Bobrinskoj, 1926, according to current nomenclature, e.g. Strelkov 1986, Simmons 2005). The Kuzjakin's (1950) mapping point as a record in Afghanistan was accepted by Aellen (1959) and Gaisler (1971). However, Kuzjakin (1950: 389) in the description of distribution range of '*Vespertilio ognevi*' (= *Eptesicus bottae*) mentioned only Fejzabad in 'gornaja Buhara' = upper or mountainous Bukhara, i.e. western Tajikistan of the present days. Kuzjakin (1950) adopted this record from Bobrinskoj (1918) and Bobrinskoy (1925). Ognev (1928) reported a capture of two bats, male and female, from Fejzabad (Karategin) [38° 19' N, 69° 31' E; Tajikistan, 20 km E of Dushanbe] made on 28 July 1914 by L. L. Nožin (see Bobrinskoy 1925). Strelkov (1963: 202) mentioned the range of the form *ognevi* "Вне пределов СССР найден лишь в югозападной Монголии; возможно, встречается в Ираке" (= Out of the borders of the [former] USSR, it was found only in southwestern Mongolia; perhaps, there is possible to meet it in Iraq), apparently, based on the reports by Bobrinskoj (1926, 1929). Kuzjakin (1965) again reported occurrence in Upper Bukhara and named four sites (Sohta-Činar, Kiik-Dagan, Fejzabad, Tamerlan canyon) exactly according to Bobrinskoy (1925). In the distribution map, Kuzjakin (1965) marked a point that corresponds to Fejzabad in Tajikistan, not in Afghanistan, which was given in his previous book (Kuzjakin 1950). In conclusion, *E. bottae* is not a member of the fauna of Afghanistan according to the present knowledge, since the published records were in fact erroneously interpreted findings of a different species or from a different region.

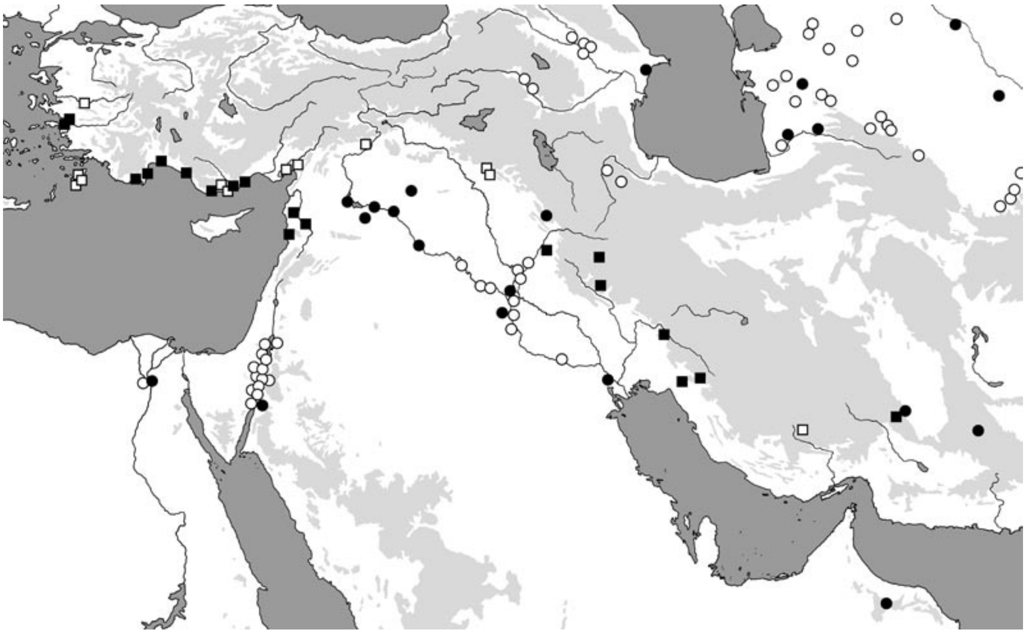


Fig. 92. Records of smaller forms of the genus *Eptesicus* Rafinesque, 1820 in the Middle East: full symbols – sites of revised material origin, open symbols – sites of non-revised material origin, circles – *E. bottae* (Peters, 1869), squares – *E. anatolicus* Felten, 1971.

Felten 1971, Khajuria 1988, Nader & Kock 1990b) as well as the Tigris (Fitzinger 1870b, Thomas 1919, Cheesman 1920, Sanborn 1940, Hatt 1959, Nader 1969, Felten 1971, Harrison 1972, Spitzenberger 1979, Nadachowski et al. 1990, Nader & Kock 1990b) and from Basra (von Wettstein 1913, Thomas 1919, Harrison 1956b, Felten 1971). DeBlase (1980) found two old records from northwestern Iran (Zanjan, Sat Cham; cf. De Filippi 1865) to be of *E. bottae*. These records may well connect Transcaucasian part of its distribution range (Nader & Kock 1990b).

Syria (Fig. 93). *E. bottae* is a medium-frequent bat in Syria, 10 records are known from the country (Table 1); it inhabits exclusivelly deserts of the Euphrates Basin. The species was recorded in Syria for the first time by Ebenau (1994, 1996) and Shehab et al. (2004) who both recorded it in a restricted area near Raqqa [9, 10]. Our records show the distribution along the entire Euphrates Valley down from Balis [1–6] and also in adjacent sites of the Valley, in the Jebel ‘Abd al ‘Aziz Mts and in ruins of Rasafah [7, 8]. *E. bottae* is one of the commonest bat species in the desert part of Syria, after *Pipistrellus kuhlii* and *Otonycteris hemprichii*. This range well connects the broad distribution in Iraq and also predicts a possible presence in the Turkish part of Mesopotamia.

Field notes. The roosts of *Eptesicus bottae* were found only in ancient ruins associated to the Euphrates Valley. Nursery colonies were discovered only in the deserted town of Rasafah (Figs. 94–97). Several of them were found on 16 June 1998; two colonies of about 25 and 15 individuals roosted in fissures between stones in towers of the northern walls and one colony of ca. seven individuals was found roosting similarly in the western wall. Solitary individuals were discovered in fissures between stones in many places throughout the ruins. On 13 May 2001, a colony of ca.

25 bats was revealed in a fissure of the western wall as well as two males roosting solitarily in the ruins. A single male was also found to roost in a ceiling crevice of a tomb in the necropolis at Balis and another one between vault stones in the deserted city of Dura Europos at As Salihiyyah (Figs. 25–27). Similarly as in Iraqi Mesopotamia (Harrison 1956b, Al-Robaae 1966), the known roosts of *E. bottae* in Syria are situated in artificial shelters only.

E. bottae was recorded at several sites also by netting; over 50 individuals were caught at the opening of cisterns in the centre of the ruins of Rasafah on 16 June 1998 (Figs. 94, 95), smaller numbers at the same place on 13 April and 13 May 2001. Two individuals were captured at the entrances of a small cave above the village of Khazneh in the Jebel ‘Abd al ‘Aziz Mts (Fig. 98). At As Salihiyyah, *E. bottae* was netted at two places, one female at the entrance to an underground corridor in the excavation area of Dura Europos (Fig. 27) and two males at the entrance of a small cave ca. 1.5 km northwest of these ruins. Ebenau (1994, 1996) reported on a netting of four individuals at Qatr Magara (Fig. 18).

Bat species associated to *E. bottae* are also desert and semi desert elements: *O. hemprichii* and *P. kuhlii* (Rasafah) and *R. ferrumequinum* (Dura Europos) were found in the same roosts in the ruins. During a netting session at Khazneh, also *T. nudiventris*, *P. kuhlii* and *O. hemprichii* were recorded, and at a small cave near As Salihiyyah, also individuals of *R. ferrumequinum* were caught. Ebenau (1994, 1996) reported on netting of *E. bottae* together with *E. serotinus*, *P. kuhlii* and *M. schreibersii* at Qatr Magara.

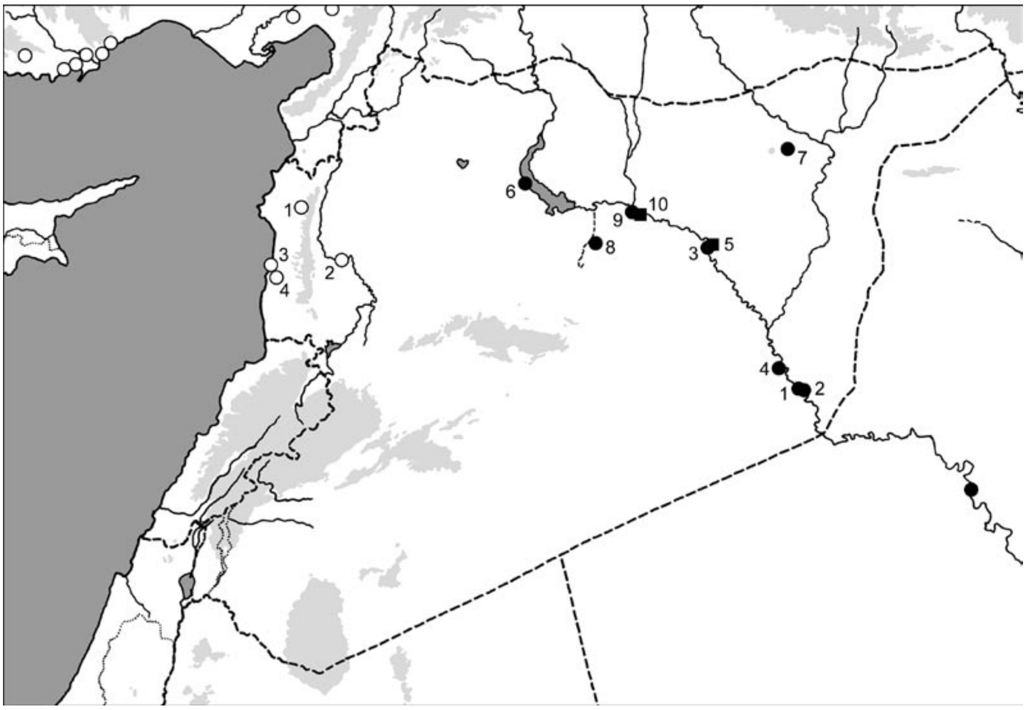


Fig. 93. Records of *Eptesicus bottae* (Peters, 1869) s.s. (closed symbols) and *E. anatolicus* Felten, 1971 (open symbols) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

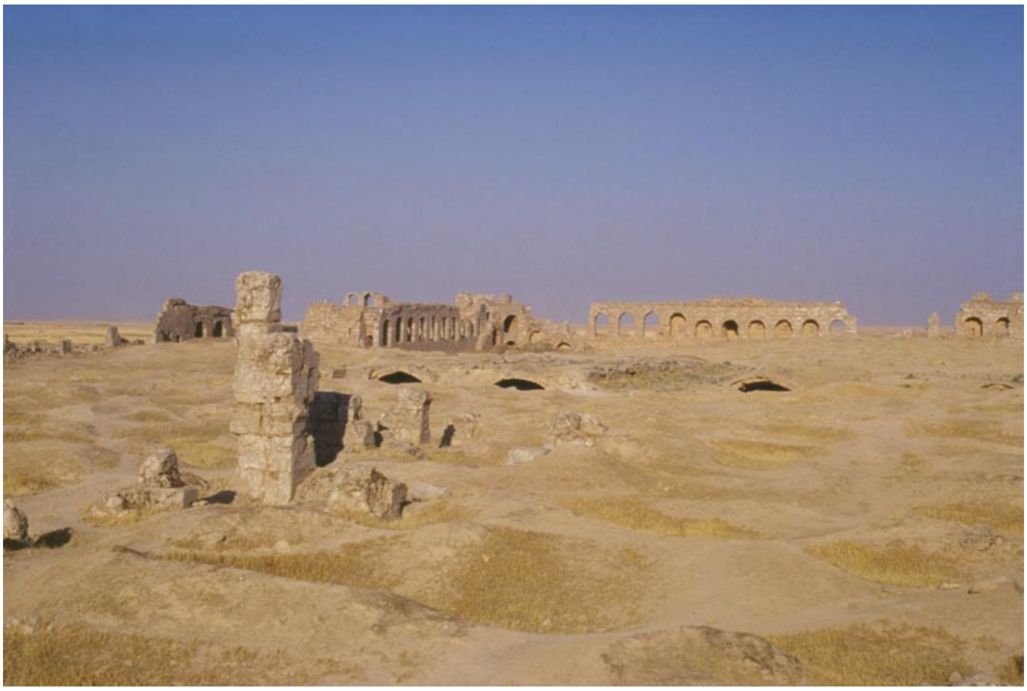


Fig. 94. Ruins of the ancient city of Rasafah. In these ruins, colonies of *Taphozous nudiventris*, *Eptesicus bottae*, *Pipistrellus kuhlii*, and *Otonycteris hemprichii* were repeatedly found. Note the semi-circular openings of the huge underground cistern in the centre of the picture (see Fig. 95); these openings represent important swarming place of the Rasafah bat community (see the reviews of records of the above species) (photo by P. Benda).

Pregnant females of *E. bottae* were collected in Rasafah on 13 April 2001 and at Khazneh on 17 May 2001. The female from the latter place contained two foeti, their crown-rump length was 19.4 mm. Almost at the same time, on 13 May 2001 in Rasafah, we recorded lactating females, each of them with non-volant juveniles with LAt 22.6–35.8 mm (mean 30.9 mm = 70.2% of the mean from adults; n=7: 4 m, 3 f). On 16 June 1998 in Rasafah, we recorded lactating females with full-grown volant juveniles (LAt 41.5–44.6 mm, mean 43.19 mm; n=8). A lactating female was also netted at As Salihiyyah on 18 June 1998. These data on reproduction mostly conform with those given by Al-Robaae (1966) from Iraq, by Harrison (1964a) and Mendelssohn & Yom-Tov (1999) for *E. b. innesi* from southern Palestine, and by Nader & Kock (1990b) for *E. b. bottae* from Saudi Arabia. It seems that births in *E. bottae* may occur from the end of April to late May.

E. bottae was found in the diet of *Tyto alba* from Syria (Shehab et al. 2004, our data), but it was not identified in the diet of other owls. Its remains represented 0.06–3.83% per sample volume of all prey items of the barn owl diet from Syria (and 0.07–4.55% of mammalian and 0.18–38.10% of bat items) analysed by us (Table 35). Remains of *E. bottae* were found also in the diet of *Tyto alba* in Palestine (Obuch unpubl.), of *Bubo bubo* and *Strix aluco* in Iran (Obuch unpubl.), and of *Bubo bubo* in Kirghizstan (Obuch & Rybin 1993).

MATERIAL EXAMINED. 3 ma, 1 fa (NMP 48031, 48972, 48805 [S+A], 48973 [S+B]), As Salihiyyah, 18 June 1998, 20 April 2001, 16 May 2001, leg. M. Andreas, P. Benda, P. Munclinger, P. Nová, A. Reiter, M. Uhrin & D. Weinfurtová; – 1 ind.

(NMP 90373; 1 rostral fragment, pair of mandibles, from owl pellets), As Salihiyyah, 19 April 2001, leg. J. Obuch; – 1 ma (NMP 48770 [S+A]), Balis, 13 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma, 1 fa (NMP 48818, 48819 [S+A]), Khazneh, Jebel ‘Abd al ‘Aziz, 17 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ind. (SMF 84480; rostrum, pair of mandibles, from owl pellet), Euphrates Valley cliffs near Qatr Magara, 19 March 1996, leg. C. Ebenau; – 1 ma, 10 mj, 15 fa, 5 fj (NMP 47980–47992, 48960–48965, 48771–48775 [S+A], 48776–48782 [A]), Rasafah, 16 June 1998, 13 April 2001, 13 May 2001, leg. M. Andreas, P. Benda, P. Munclinger, P. Nová, A. Reiter, M. Uhrin & D. Weinfurtová; – 5 inds. (NMP 90374; 1 skull, 5 left mandibles, 4 right mandibles, from owl pellets), Rasafah, 16 June 1998, leg. J. Obuch; – 11 inds. (NMP 90375; 6 skulls, 8 left mandibles, 11 right mandibles, from owl pellets), Rasafah, 14 April 2001, leg. J. Obuch; – 1 ind. (NMP 90376; skull, from owl pellet), Zalabiyyeh, 15 April 2001, leg. J. Obuch.

Morphology. See Table 23 and Appendix III for biometric data on the Syrian specimens of *Eptesicus bottae*. Skulls and bacula extracted from the specimens of *E. bottae* and *E. anatolicus* from Syria are shown in Figs. 99 and 103. For comments see Taxonomy.

Taxonomy. *Eptesicus bottae* is considered a polymorphic species with a number of subspecies (Harrison 1975, Corbet 1978, Nader & Kock 1990b, Koopman 1994, Horáček et al. 2000, Simmons 2005). All the described subspecies meet in the region of the Middle East, however in mutually isolated ranges (see Distribution). According to the current taxonomy (Nader & Kock 1990b), the species *E. bottae* is divided into seven forms: *E. b. bottae* (Peters, 1869) (terra typica: Arabien given by Peters 1869; restricted by Nader & Kock 1990b to ‘southwestern Yemen, between Al

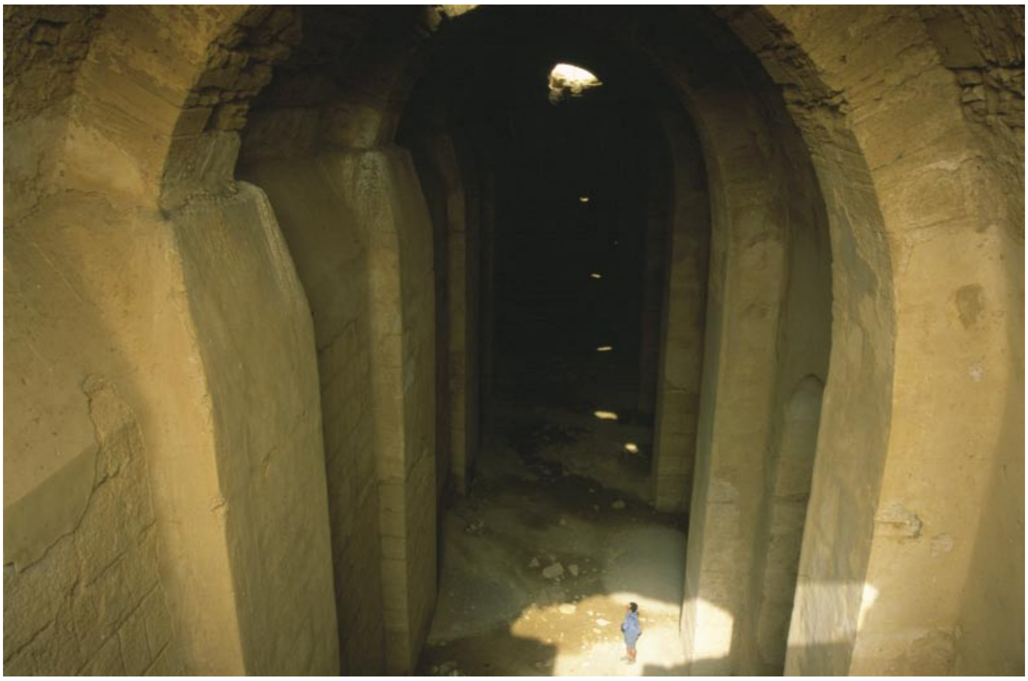
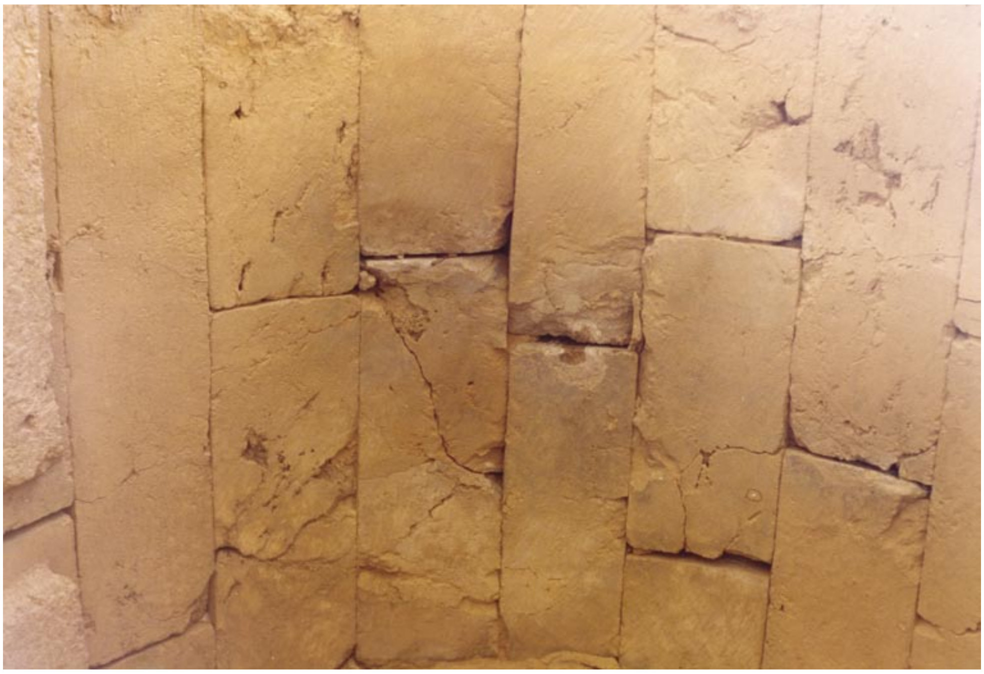


Fig. 95. Spacious underground cistern in the centre of the ruined ancient city of Rasafah. This cistern serves as a shelter for *Tyto alba* (observed there several times), which forages on the bats swarming around cistern openings (see Table 35). However, the cistern is presumably used as a shelter also by bats, although the ceiling fissures were inaccesible for a check (photo by A. Reiter).



Figs. 96, 97. Rasafah, bat roosting places. 96 (above) – arcades of the western city wall of the ruined ancient city of Rasafah. 97 (below) – fissures between ceiling stones in large number of these arcades were found to dwell by nursery colonies of three bat species (*Eptesicus bottae*, *Pipistrellus kuhlii*, *Otonycteris hemprichii*) (both photos by P. Benda).

Table 23. Basic biometric data on examined Syrian and comparative samples of *Eptesicus bottae* (Peters, 1869) and *E. anatolicus* Felten, 1971. For abbreviations see pp. 10, 11. Part I. *E. bottae*

	Syria					Iraq					Baluchestan				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	23	**43.95**	41.1	47.0	1.351	3	**46.37**	45.5	47.0	0.777	13	**43.31**	41.2	46.4	1.595
LCr	23	**16.83**	15.88	17.63	0.417	21	**16.76**	15.84	17.38	0.344	13	**16.41**	15.67	17.29	0.466
LCb	22	**16.55**	15.62	17.40	0.451	20	**16.52**	15.55	16.92	0.303	13	**16.07**	15.46	16.83	0.448
LaZ	22	**11.21**	10.52	11.63	0.307	10	**11.27**	10.78	11.57	0.239	10	**10.82**	10.47	11.18	0.214
LaI	23	**3.85**	3.58	4.12	0.151	21	**3.67**	3.48	3.87	0.113	13	**3.72**	3.57	3.92	0.109
LaInf	23	**5.30**	4.91	5.72	0.209	21	**5.26**	4.85	5.68	0.197	13	**5.13**	4.68	5.42	0.216
LaN	23	**7.94**	7.37	8.50	0.252	21	**7.80**	7.25	8.22	0.212	13	**7.73**	7.50	8.18	0.195
LaM	23	**8.90**	8.58	9.23	0.209	20	**8.96**	8.65	9.30	0.172	13	**8.74**	8.28	9.07	0.227
ANc	22	**5.86**	5.60	6.15	0.145	21	**5.80**	5.53	6.10	0.167	13	**5.68**	5.38	6.02	0.199
ACr	23	**7.59**	7.25	7.82	0.145	11	**7.46**	7.19	7.75	0.215	13	**7.40**	6.75	7.73	0.287
CC	23	**5.29**	4.88	5.60	0.199	21	**5.36**	4.98	5.82	0.186	13	**5.09**	4.82	5.30	0.162
P^4P^4	23	**5.98**	5.02	6.35	0.288	21	**6.05**	5.75	6.70	0.235	13	**5.84**	5.52	6.15	0.202
M^3M^3	23	**7.17**	6.12	7.56	0.319	20	**7.00**	6.73	7.32	0.181	13	**6.99**	6.54	7.26	0.247
IM^3	23	**7.22**	6.72	7.62	0.216	20	**7.20**	6.87	7.48	0.158	13	**7.07**	6.77	7.46	0.189
CM^3	23	**6.15**	5.84	6.47	0.169	21	**6.09**	5.82	6.40	0.145	13	**6.00**	5.77	6.28	0.149
P^4M^3	23	**4.87**	4.56	5.17	0.155	21	**4.75**	4.52	5.10	0.132	13	**4.79**	4.62	5.01	0.123
M^1M^3	23	**3.95**	3.67	4.15	0.137	21	**3.76**	3.40	4.08	0.161	13	**3.85**	3.68	4.07	0.117
LMd	23	**12.20**	11.53	12.80	0.359	21	**12.20**	11.52	12.55	0.218	13	**11.86**	11.47	12.33	0.261
ACo	23	**4.27**	3.85	4.58	0.186	20	**4.28**	3.98	4.78	0.198	13	**4.13**	3.90	4.38	0.144
IM_3	23	**7.53**	7.06	7.93	0.234	21	**7.45**	7.12	7.77	0.181	13	**7.32**	7.12	7.57	0.137
CM_3	23	**6.73**	6.28	7.11	0.203	21	**6.66**	6.42	6.93	0.138	13	**6.55**	6.33	6.82	0.135
P_4M_3	23	**5.31**	4.96	5.63	0.198	21	**5.18**	4.94	5.45	0.114	13	**5.18**	4.97	5.37	0.107
M_1M_3	23	**4.50**	4.17	4.75	0.149	21	**4.35**	4.10	4.56	0.112	13	**4.35**	4.20	4.45	0.075
CM^3/LCb	22	**0.372**	0.358	0.383	0.007	20	**0.369**	0.353	0.378	0.007	13	**0.373**	0.363	0.387	0.008
M^3M^3/LCb	22	**0.434**	0.420	0.458	0.018	19	**0.424**	0.403	0.450	0.014	13	**0.435**	0.411	0.463	0.019
CC/CM^3	23	**0.861**	0.811	0.918	0.027	21	**0.880**	0.816	0.930	0.032	13	**0.848**	0.806	0.899	0.027
M^3M^3/CM^3	23	**1.167**	1.136	1.224	0.048	20	**1.150**	1.081	1.210	0.036	13	**1.166**	1.099	1.235	0.044

Hudaydah, Ta'izz and Al Mukha'); *E. b. innesi* (Lataste, 1887) (t.t.: Cairo, Egypt); *E. b. ognevi* Bobrinskoj, 1918 (t.t.: Sohta-Činar, Gissarskoe Bekstvo Dist., Bukhara [= western Tajikistan]); *E. b. hingstoni* Thomas, 1919 (t.t.: Baghdad, Mesopotamia [Iraq]); *E. b. anatolicus* Felten, 1971 (t.t.: Alanya, Turkey); *E. b. omanensis* Harrison, 1975 (t.t.: Masjid Ma'illah, Jebel Al Akhdar, Oman); and *E. b. taftanimontis* de Roguin, 1987 (t.t.: Kusheh, Kuh-e-Taftan, Persian Baluchestan).

Primarily, these taxa were mostly described as separate species (*bottae*, *innesi*, *ognevi*, *hingstoni*, *anatolicus*) and some of them were considered separate species for a long time; e.g. *innesi* by Trouessart (1897), Anderson (1902), Thomas (1919), Allen (1939), Setzer (1952) or Harrison (1963c). On the other hand, the form *bottae* was synonymised with *E. serotinus* (Dobson 1878, Trouessart 1897) and the form *ognevi* was soon after its description synonymised by Russian authors (Bobrinskoi 1931, Bobrinskoy 1925, Ognev 1927, 1928) with the name *sodalis* Barrett-Hamilton, 1910 (type loc.: Buştenari, Prahova, Romania), a form currently considered a synonym of *E. serotinus* (Hanák & Gaisler 1971, Harrison 1975, Corbet 1978, Ruprecht 1990, Koopman 1993, Borisenko & Pavlinov 1995, etc.).

Ellerman & Morrison-Scott (1951) suggested the first taxonomic synthesis of the medium-sized *Eptesicus* bats from the Middle East. They assigned two northern forms, *hingstoni* and *ognevi* as separate subspecies to the species *E. sodalis* (which they considered an independent European species), and the southern forms, *bottae* and *innesi* as two separate subspecies to the North African

Table 23. (continued) Part II. *E. bottae*

	Central Asia					Transcaucasia					Egypt & Jordan				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	25	**42.80**	40.4	45.5	1.279	23	**41.93**	38.8	44.2	1.336	0	–	–	–	–
LCr	33	**16.68**	15.80	17.32	0.356	27	**16.40**	15.42	17.20	0.388	4	**16.23**	16.16	16.34	0.085
LCb	34	**16.43**	15.66	17.02	0.296	27	**16.15**	15.07	16.87	0.380	4	**15.91**	15.75	16.01	0.110
LaZ	29	**11.14**	10.70	11.67	0.279	27	**10.95**	10.25	11.55	0.278	4	**10.55**	10.38	10.62	0.114
LaI	35	**3.80**	3.58	4.08	0.119	27	**3.70**	3.42	3.90	0.116	4	**3.64**	3.42	4.02	0.261
LaInf	35	**5.26**	4.92	5.68	0.228	27	**5.17**	4.77	5.49	0.177	4	**5.02**	4.77	5.42	0.284
LaN	34	**7.91**	7.57	8.32	0.164	27	**7.90**	7.57	8.28	0.172	4	**7.64**	7.48	7.94	0.204
LaM	34	**8.90**	8.59	9.27	0.184	27	**8.74**	8.42	9.17	0.186	4	**8.69**	8.48	9.07	0.263
ANc	34	**5.77**	5.28	6.98	0.289	27	**5.58**	5.32	6.10	0.204	4	**5.61**	5.44	5.97	0.241
ACr	30	**7.39**	6.92	7.85	0.219	27	**7.30**	6.98	7.68	0.171	4	**7.25**	7.09	7.57	0.225
CC	35	**5.30**	4.94	5.60	0.146	27	**5.20**	4.28	5.45	0.238	4	**5.04**	4.89	5.18	0.133
P^4P^4	35	**6.11**	5.54	7.26	0.287	27	**6.01**	5.62	6.42	0.178	4	**5.77**	5.52	5.93	0.181
M^3M^3	35	**7.21**	6.61	7.89	0.230	27	**7.03**	6.57	7.34	0.211	4	**7.06**	6.76	7.29	0.220
IM^3	34	**7.33**	6.93	7.66	0.166	27	**7.20**	6.72	7.52	0.200	4	**6.86**	6.72	7.03	0.128
CM^3	35	**6.25**	5.93	6.58	0.146	27	**6.15**	5.72	6.53	0.177	4	**5.85**	5.82	5.87	0.022
P^4M^3	35	**4.96**	4.73	5.33	0.140	27	**4.87**	4.55	5.23	0.153	4	**4.71**	4.68	4.75	0.032
M^1M^3	35	**4.01**	3.71	4.43	0.139	27	**3.94**	3.68	4.20	0.135	4	**3.70**	3.64	3.79	0.072
LMd	35	**12.18**	11.67	12.58	0.221	27	**11.99**	11.63	12.42	0.217	4	**11.54**	11.43	11.76	0.154
ACo	35	**4.22**	3.92	4.62	0.197	27	**4.02**	3.72	4.27	0.120	4	**4.18**	3.94	4.28	0.160
IM_3	35	**7.64**	7.28	8.05	0.175	27	**7.52**	7.14	7.83	0.203	4	**7.16**	7.07	7.22	0.065
CM_3	35	**6.80**	6.57	7.17	0.161	27	**6.72**	6.42	7.02	0.167	4	**6.40**	6.36	6.47	0.050
P_4M_3	35	**5.38**	5.11	5.69	0.134	27	**5.27**	5.03	5.56	0.137	4	**5.00**	4.90	5.08	0.075
M_1M_3	35	**4.52**	4.28	4.85	0.114	27	**4.44**	4.21	4.68	0.121	4	**4.25**	4.18	4.33	0.066
CM^3/LCb	34	**0.380**	0.364	0.394	0.008	27	**0.381**	0.370	0.396	0.008	4	**0.368**	0.366	0.370	0.002
M^3M^3/LCb	34	**0.439**	0.412	0.468	0.012	27	**0.435**	0.415	0.457	0.010	4	**0.444**	0.424	0.455	0.014
CC/CM^3	35	**0.847**	0.798	0.900	0.019	27	**0.846**	0.796	0.900	0.046	4	**0.860**	0.834	0.890	0.025
M^3M^3/CM^3	35	**1.154**	1.068	1.199	0.029	27	**1.142**	1.095	1.184	0.023	3	**1.193**	1.154	1.220	0.035

form *E. isabellinus* (Temminck, 1840) (t. t.: environs de Tripoli, Afrique septentrionale [Libya]). This view was accepted by some authors (Sanborn & Hoogstraal 1955, Hatt 1959, Roberts 1977) but not absolutely, as shown by Harrison (1956b, c), Strelkov (1963), or Kuzjakin (1965). Moreover, Harrison (1963d) recognised the form *isabellinus* to be a subspecies of *E. serotinus*, and therefore suggested *innesi* to be independent from *isabellinus*; he also compared *innesi* and *hingstoni* and found them to be very similar, without any "valid reason for regarding them as distinct species" (Harrison 1963c).

Harrison (1964a) revised the classification of medium-sized *Eptesicus* bats proposed by Ellerman & Morrison-Scott (1951). He suggested all three medium-sized forms from the Middle East known at that time (*bottae*, *innesi*, *hingstoni*) to be considered only one species, of which the name *bottae* had been a senior synonym; however, he also agreed with inclusion of the form *sodalis* under this species. This general opinion was complemented by Hanák & Gaisler (1971), who found *E. ognevi* – in that time separate species – to be a subspecies of *E. bottae*, being very similar to *E. b. hingstoni*, and on the other hand, they found the European form *sodalis* to be a synonym of *E. serotinus serotinus*.

This concept, based on records by Harrison (1964a) and Hanák & Gaisler (1971), concerning one polytypic species instead of a pair or a group of species, has been broadly accepted (e.g., Gaisler 1971, Harrison 1975, Corbet 1978, Strelkov 1981, DeBlase 1980, Nader & Kock 1983c, Table 23. (continued) Part III. *E. anatolicus*. * LAt data taken from Spitzenberger (1994)

	Syria					Turkey					Iran				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	12	**48.16**	45.9	49.9	1.486	32*	**47.51**	44.9	50.0	–	7	**47.99**	46.4	50.4	1.774
LCr	12	**17.89**	17.22	18.97	0.521	30	**17.98**	17.22	19.04	0.375	7	**17.76**	17.02	18.37	0.456
LCb	12	**17.47**	16.94	18.38	0.410	30	**17.55**	16.63	18.32	0.362	7	**17.46**	16.75	17.90	0.404
LaZ	12	**12.59**	12.20	13.26	0.322	30	**12.62**	12.00	13.08	0.275	7	**12.65**	12.27	13.09	0.306
LaI	12	**4.03**	3.75	4.22	0.159	30	**3.97**	3.72	4.22	0.119	7	**3.95**	3.82	4.13	0.101
LaInf	12	**5.93**	5.58	6.18	0.190	30	**5.79**	5.00	6.03	0.199	7	**5.91**	5.80	6.12	0.128
LaN	12	**8.52**	8.22	8.75	0.161	30	**8.58**	8.30	8.93	0.176	7	**8.49**	8.37	8.62	0.098
LaM	12	**9.97**	9.48	10.54	0.268	30	**9.96**	9.32	10.30	0.230	7	**9.98**	9.88	10.12	0.086
ANc	12	**6.54**	6.07	6.82	0.224	30	**6.58**	6.27	6.92	0.167	6	**6.47**	6.21	6.65	0.181
ACr	11	**8.25**	7.92	8.54	0.196	26	**8.41**	7.92	8.82	0.246	5	**8.26**	7.84	8.48	0.243
CC	12	**5.82**	5.63	6.08	0.144	30	**5.85**	5.52	6.15	0.144	6	**5.83**	5.52	6.11	0.253
P^4P^4	12	**6.41**	6.12	6.67	0.166	30	**6.46**	6.12	6.97	0.181	7	**6.42**	6.18	6.62	0.138
M^3M^3	12	**7.97**	7.70	8.32	0.205	30	**7.96**	7.45	8.47	0.228	7	**7.84**	7.53	8.17	0.203
IM^3	12	**7.79**	7.61	8.12	0.159	30	**7.88**	7.60	8.22	0.151	7	**7.78**	7.52	8.08	0.230
CM^3	12	**6.69**	6.45	6.92	0.133	30	**6.69**	6.48	7.00	0.138	6	**6.69**	6.47	6.85	0.171
P^4M^3	12	**5.33**	5.19	5.54	0.106	30	**5.33**	5.13	5.62	0.118	7	**5.32**	5.07	5.42	0.129
M^1M^3	12	**4.31**	4.12	4.43	0.099	30	**4.33**	4.10	4.52	0.101	7	**4.30**	4.17	4.40	0.087
LMd	12	**13.22**	12.74	14.03	0.348	30	**13.25**	12.79	13.90	0.294	7	**13.33**	12.83	13.59	0.288
ACo	11	**4.87**	4.65	5.23	0.169	30	**4.85**	4.52	5.23	0.180	7	**4.91**	4.64	5.14	0.150
IM_3	12	**8.24**	7.95	8.64	0.189	30	**8.26**	7.85	8.63	0.180	7	**8.28**	8.00	8.42	0.165
CM_3	12	**7.32**	7.11	7.66	0.171	30	**7.33**	6.98	7.57	0.151	7	**7.29**	7.03	7.55	0.188
P_4M_3	12	**5.73**	5.52	6.00	0.172	30	**5.73**	5.43	5.96	0.139	7	**5.73**	5.57	5.92	0.135
M_1M_3	12	**4.88**	4.71	5.11	0.125	30	**4.88**	4.73	5.07	0.087	7	**4.55**	2.57	4.97	0.877
CM^3/LCb	12	**0.383**	0.376	0.391	0.005	30	**0.381**	0.367	0.392	0.007	7	**0.383**	0.377	0.389	0.004
M^3M^3/LCb	12	**0.456**	0.442	0.473	0.011	30	**0.454**	0.434	0.475	0.011	7	**0.449**	0.437	0.467	0.013
CC/CM^3	12	**0.869**	0.849	0.885	0.010	30	**0.875**	0.818	0.910	0.019	7	**0.871**	0.839	0.905	0.022
M^3M^3/CM^3	12	**1.191**	1.163	1.236	0.022	30	**1.191**	1.143	1.268	0.030	7	**1.172**	1.145	1.209	0.025

1990b, Strelkov & Šajmardanov 1983, Butovskij et al. 1985, Qumsiyeh 1985, Pavlinov & Rossolimo 1987, 1998, Harrison & Bates 1991, Koopman 1993, 1994, Spitzenberger 1994, Borisenko & Pavlinov 1995, Horáček et al. 2000, Simmons 2005, etc.).

Felten (1971) described a new *Eptesicus* species from southwestern Turkey, which he named *E. anatolicus*. He distinguished it on the basis of several characters (body and skull size, relative height of braincase, molar reduction, hair and pelage coloration) from other *Eptesicus* populations and/or taxa of the Palaearctic, namely the larger *serotinus* and *sodalis*, and smaller *bottae*, *hingstoni*, and *ognevi*, as well as from tiny Asian representatives (*bobrinskoi*, *nasutus*, *nilssonii* [= *gobiensis*], *walli*). Although Felten (1971) gave a good description and comprehensive differential diagnosis of his *E. anatolicus*, Harrison (1975) concluded that "this recently described form seems from its description to represent a larger race of *E. bottae*". Albeit this statement had only a tentative validity, being based on examination of very limited comparative samples, it was completely accepted by subsequent authors (Corbet 1978, DeBlase 1980, Nader & Kock 1983c, 1990b, Harrison & Bates 1991, Koopman 1993, 1994, Spitzenberger 1994, Benda & Horáček 1998, Horáček et al. 2000, etc.).

Harrison (1975) also described another subspecies of *E. bottae*, *E. b. omanensis* from northeastern Oman. The last form of this polytypic species, *E. b. taftanimontis*, was described by de Roguin (1987) from Persian Baluchestan. Interestingly, no synonym occurs in the taxonomy of

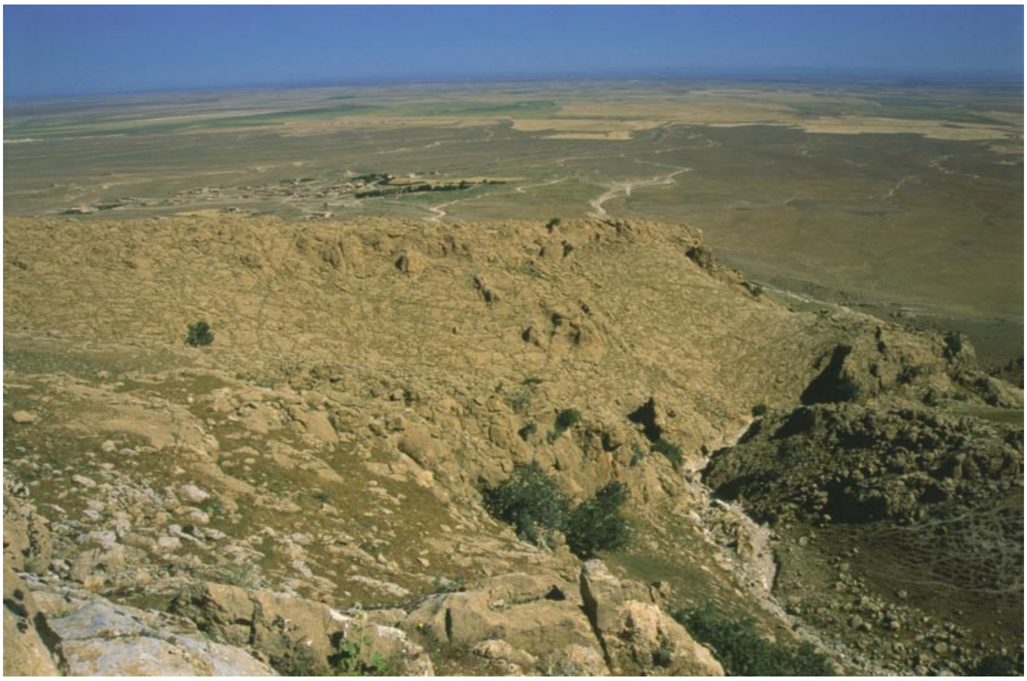


Fig. 98. Steppe landscape below the Jebel ‘Abd al ‘Aziz Mts at Khazneh. This mountan ridge lies on the northern margin of distribution ranges of several Saharo-Sindian bat species in Syria and in the Near East (*Taphozous nudiventris*, *Eptesicus bottae*, *Otonycteris hemprichii*) (photo by A. Reiter).

the *bottae* group – all the proposed names are considered those of valid taxa (see e.g. Simmons 2005).

According to this taxonomical inference (Nader & Kock 1990b, Harrison & Bates 1991), at least four subspecies of *E. bottae* occur in the Near East; *E. b. innesi* (Lataste, 1887) in Palestine and Jordan (Atallah 1977, Nader & Kock 1983c, Bates & Harrison 1989, Qumsiyeh 1985, 1996, Qumsiyeh et al. 1992, Mendelssohn & Yom-Tov 1999, Ferguson 2002), *E. b. hingstoni* Thomas, 1919 in Syria and Iraq (Harrison 1964a, Felten 1971, Nadachowski et al. 1990, Nader & Kock 1990b, Shehab et al. 2004), *E. b. ognevi* Bobrinskoj, 1918 in northwestern Iran (DeBlase 1980) and *E. b. anatolicus* Felten, 1971 in Rhodes (Greece), southern Turkey, Northern Iraq and southwestern Iran (DeBlase 1980, Nader & Kock 1983c, Spitzenberger 1994, Benda & Horáček 1998, von Helversen 1998).

Position of *Eptesicus anatolicus* Felten, 1971. According to our data on bats from Syria and also from Iran, we suppose that the complex of forms, which are presently included into a rank of the only species *E. bottae*, actually comprises at least two separate species (as we suggested preliminarily in our previous paper, Hanák et al. 2001). The form *anatolicus* is the most distinct representative among all the subspecies recognised, both in ecological or geographical but mostly in morphological characters.

Whilst almost all the subspecies are inhabitants of a desert (or savanna) restricted to more or less isolated distribution spots in arid regions, separated each from other by considerable distances, the form *anatolicus* is the only ihabitant of the Mediterranean arboreal zone and lives in parapatry with two other desert subspecies. The smallest distance between the records of *anatolicus* and *hingstoni* in the western Syria is ca. 150 km (betw. Qala'at Sheisar and Balis, see above) and only ca. 80 km in northwestern Iraq and western Iran between Delaya (Nadachowski et al. 1990) and Qasr-e-Shirin [34° 32' N, 45° 35' E, ca. 360 m a. s. l.] (our unpubl. data); however, there is a gap of even 30 km (Deh Bakri [29° 05' N, 57° 56' E, ca. 1930 m a. s. l.] and Bam [29° 06' N, 58° 24' E, ca. 1010 m a. s. l.]; our unpubl. data) between the records of *anatolicus* and *taftanimontis* in southeastern Iran (Kerman Prov.), see Fig. 92. The areas of occurrence suggest a clear difference in ecological requirements between true *bottae* forms and *anatolicus*, and the proximity of records indicates an absence of gene flow between these members of the previously proposed one species. The form *anatolicus* is an inhabitant of the Mediterranean arboreal and according to its records, it lives entirely in the southern margins of Mediterranean habitats in the Near East, including Mediterranean woodland climax and steppe-maquis (*s.s.*, *sensu* Zohary 1973) in southern Turkey and western Syria and the Kurdo-Zagrosian xerophilous deciduous steppe-forest climaxes in northern Iraq and southern and western Iran (Zohary 1973, Figs. 1 and 92; see also DeBlase 1980 and Nader & Kock 1990b). All the other subspecies are restricted to the Irano-Turanian deserts and steppe-deserts in the northern part of the Middle East (*hingstoni*, *ognevi*) and to the Sudanian and Sub-Sudanian tropical deserts and savannas in its southern portion (*innesi*, *bottae*, *omanensis*, *taftanimontis*) (cf. Zohary 1973).

However, the most marked differences between *anatolicus* and other rest of the species content are found in morphological characters; (1) body and skull size; (2) skull shape; (3) baculum shape; (4) skin and pelage coloration. The Mediterranean *anatolicus* is the largest form in the whole group; in body size characters (forearm and ear lengths, weight) it creates a continuous transition between other two Syrian *Eptesicus* populations, *serotinus* and *bottae* (Fig. 100, see Appendix III). In skull dimensions, all *anatolicus* samples (Turkey, Syria, Iran) show a slight overlap in marginal variation values with other *bottae* populations from the whole distribution range, mainly in skull lengths (LCr, LCb, LMd, tooth-row lengths), however, they differ completely, without any overlaps, in skull widths and heights (LaZ, LaN, LaM; ANc, ACr) (Fig. 101, Tables 23, 24). These results suggest different relations in the whole skull formation in the two forms: *anatolicus* has a relatively broader skull and more massive braincase than all other *bottae* representatives. The skull width and height measurements as well as the skull width/height vs. skull length ratios show higher values in *anatolicus* than in any other *bottae*, and these differences are all highly significant (Figs. 102, 103, Table 24). These results demostrate the most different skull characters: the relative width of skull (LaZ/LCb), relative mastoidal width (LaM/LCb) and the relative braincase height (ANc/LCb). In these ratio characters, all the *bottae* samples created a homogenous cluster without any relation to body size of the examined bats with the only exception of *anatolicus* samples, which clearly differ and show the skulls of the latter taxon to be wider and more robust.

The principal component analysis of the skull dimensions showed similar results as their univariate and bivariate comparisons. This analysis selected 21 dimensions as highly significant for the discrimination of clusters between all compared samples; they included almost all skull measurements taken with the only exception of LaI (i.e., LCr, LCb, LaZ, LaInf, LaN, LaM, ANc, ACr, CC, LMd), and all the taken tooth-rows (Fig. 104; PC1=82.03%, PC2=4.82% of variance). The PC analysis clearly divided all compared samples into two basic clusters, that of three *anatolicus* populations and that of the rest of the species content (*bottae* s.s., *higstoni*, *innesi*, *ognevi*, *omanensis*, *taftanimontis*) where *omanensis* is also a bit separated.

Bacula of several samples of *E. bottae* were described by Hanák & Gaisler (1971), Hill & Harrison (1987) and Strelkov (1989b). However, these authors described only those of nominate

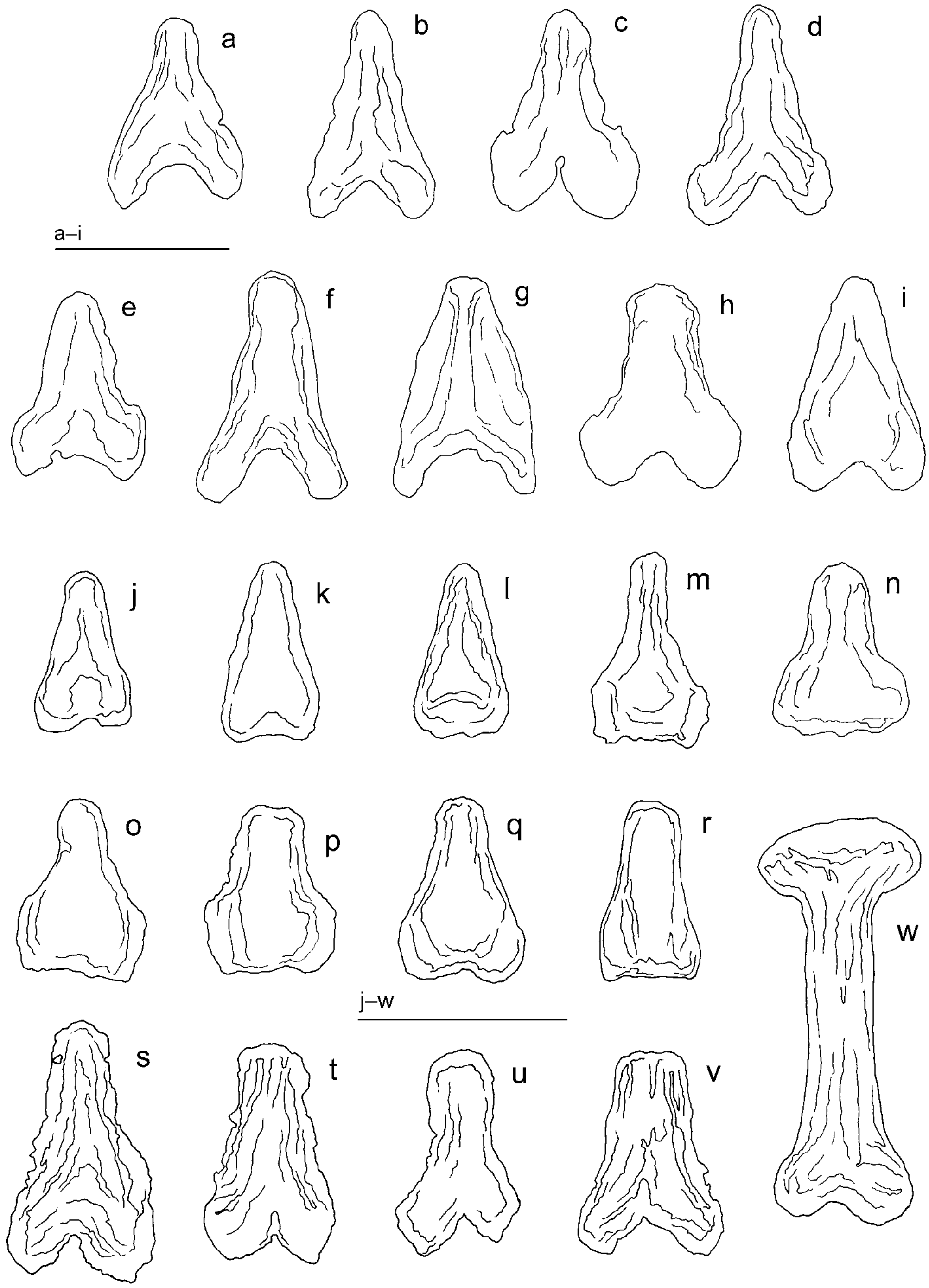

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Fig. 99. Baculum preparations from the *Eptesicus*-like bats from Syria and from comparative samples. *E. serotinus* (Schreber, 1774): a – NMP 48986, Syria, Maalula; b – NMP 48059, Syria, Slinfeh; c – NMP 48987, Syria, Maalula; d – NMP 90409, Cyprus, Troodos Forest; e – NMP 50396, Bulgaria, Ploski; f – NMP 90012, Turkey, Tuz Gölü Lake; g – NMP 49943, Libya, Leptis Magna; h – NMP 90068, Morocco, Ait-Ali; i – NMP 90091, Morocco, Berkane; *E. bottae* (Peters, 1869): j – NMP 48973, Syria, As Salihiyyah; k – NMP 48805, Syria, As Salihiyyah; l – NMP 48818, Syria, Khazneh; m – NMP 48115, Iran, Bam; n – NMP 48364, Iran, Bam; o – NMP 91323, Azerbaijan, Gobustan; p – NMP 91337, Azerbaijan, Gobustan; q – NMP 91332, Azerbaijan, Gobustan; r – NMP 91420, Azerbaijan, Gobustan; *E. anatolicus* Felten, 1971: s – NMP 48895, Syria, Qala'at Sheizar; t – NMP 48918, Syria, Qala'at al Marqab; u – NMP 47925, Turkey, Narlikuyu; v – NMP 48153, Iran, Bisotun; *Hypsugo savii* (Bonaparte, 1837): w – NMP 48069, Syria, Slinfeh. Scale bars = 1 mm.

populations of *higstoni* (Iraq), *innesi* (Egypt), *ognevi* (Central Asia), and *omanensis* (Oman). We prepared several examples of *anatolicus* (Turkey, Syria, Iran), *hingstoni* (Syria), *ognevi* (Azerbaijan), and *taftanimontis* (Iran). According to their shapes, all the available bacula fell in two basic groups. One group is composed of massive bacula of the converted Y-shape, with broad and obtusely terminated distal epiphysis and broad or divided proximal epiphysis but always with narrow medial incision present (length 0.97–1.22 mm, M=1.053; width of proximal epiphysis 0.63–0.72 mm, M=0.683; n=4). In this group, only the bacula of *anatolicus* have fallen (Fig. 99). The second group is composed by smaller bacula of the desert populations of *E. bottae* (Fig. 99; see also Hanák & Gaisler 1971: 20; Hill & Harrison 1987: 296–297; and Strelkov 1989b: 99); these bacula are of simple triangular shapes (those from Syria, Egypt and some from Central Asia) or of triangular shapes with a bit narrowed distal epiphysis (Iran, Oman, Central Asia, Transcaucasia). In some preparations of the latter group, a moderate medial dent in proximal extremity is obvious (length 0.80–0.91 mm, M=0.849; width of proximal epiphysis 0.46–0.65 mm, M=0.561; n=8). The differences among individual examples of desert populations, although present, are much

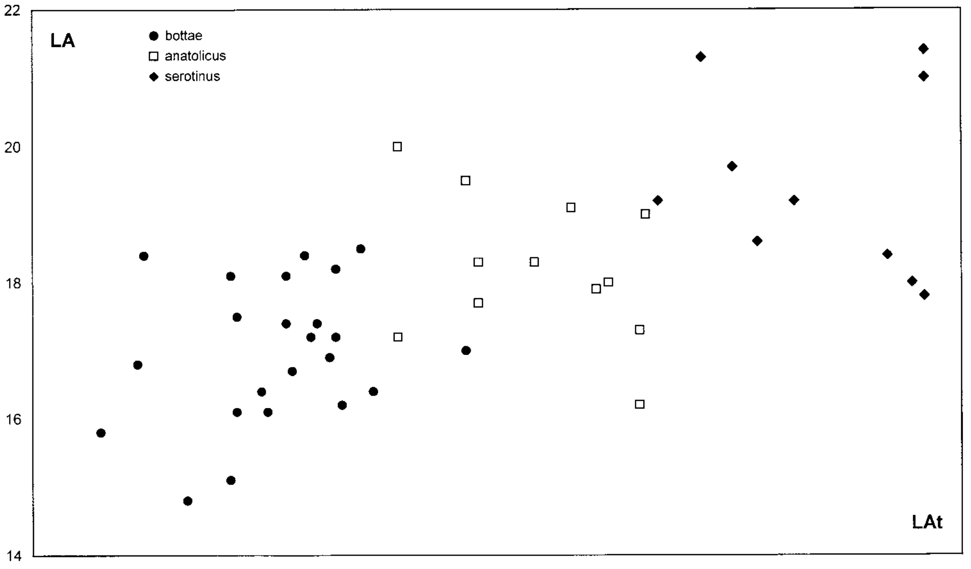
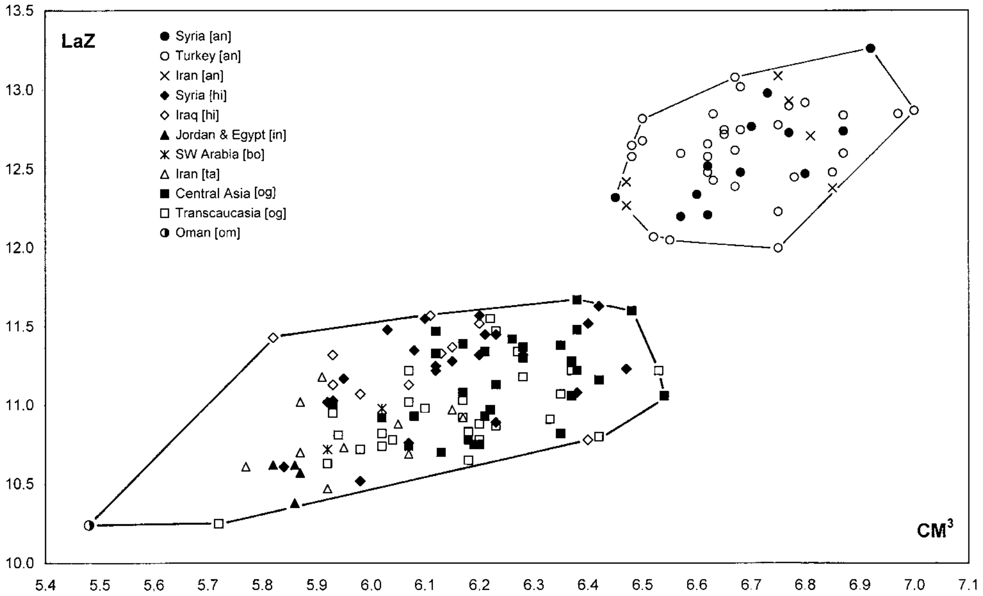
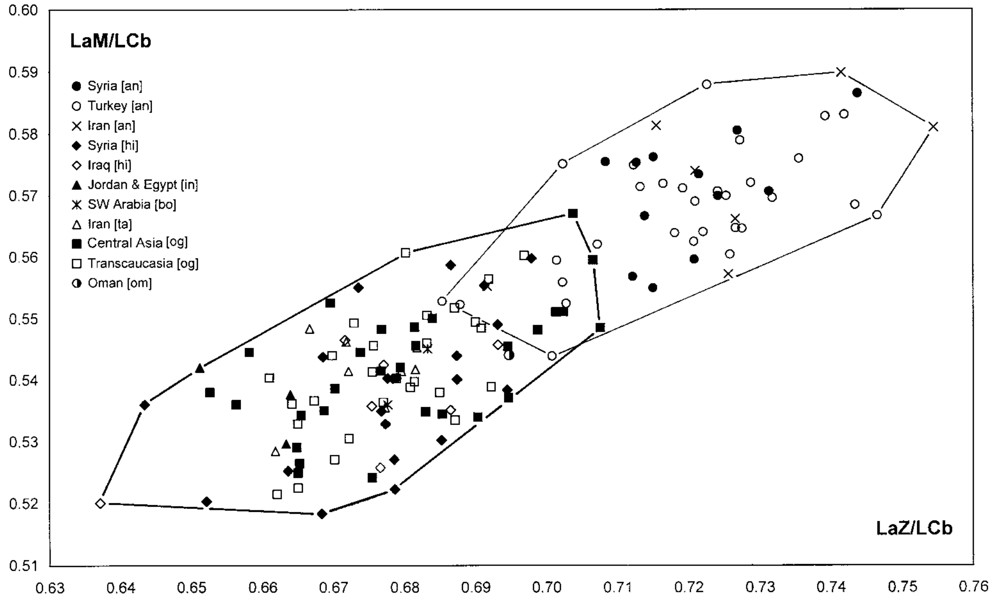


Fig. 100. Bivariate plot of individuals of three taxa of the genus *Eptesicus* Rafinesque, 1820 from Syria: forearm length (LAt) against the auricle length (LA).





Figs. 101, 102. Bivariate plot of examined Syrian and comparative samples of *Eptesicus bottae* (Peters, 1869) s.l. 101 (above) – length of upper tooth-row (CM^3) against the zygomatic width (LaZ). 102 (below) – relative width of skull (LaZ/LCb) against relative width of neurocranium (LaM/LCb). Explanation: polygons denote eco-morphs; thin-lined polygon = samples of the Mediterranean populations (*anatolicus*); bold-lined polygon = samples of the 'desert' populations; in brackets acronyms of the taxa: an = *anatolicus*; hi = *hingstoni*; in = *innesi*; bo = *bottae*; ta = *taftanimontis*; og = *ognevi*; om = *omanensis*.

Table 24. Comparison of the skull widths and their indexes and the results of ANOVA analysis of examined samples of *Eptesicus bottae* (Peters, 1869) and *E. anatolicus* Felten, 1971. For abbreviations see pp. 10, 11

			anatolicus					desert *bottae*			ANOVA
	n	**M**	min	max	SD	n	**M**	min	max	SD	F
LaZ	49	**12.62**	12.00	13.26	0.286	105	**11.05**	10.24	11.67	0.325	835.45
LaInf	49	**5.84**	5.00	6.18	0.197	126	**5.22**	4.67	5.72	0.219	299.78
LaN	49	**8.55**	8.22	8.93	0.166	125	**7.86**	7.25	8.50	0.212	423.18
LaM	49	**9.96**	9.32	10.54	0.222	124	**8.84**	8.02	9.30	0.223	896.22
ANc	48	**6.56**	6.07	6.92	0.184	124	**5.73**	5.28	6.98	0.236	473.92
ACr	42	**8.35**	7.84	8.82	0.241	111	**7.41**	6.75	7.85	0.223	515.01
CC	48	**5.84**	5.52	6.15	0.157	126	**5.25**	4.28	5.82	0.212	312.20
M^3M^3	49	**7.95**	7.45	8.47	0.219	125	**7.10**	6.12	7.89	0.259	415.39
LaZ/LCb	49	**0.720**	0.685	0.754	0.015	103	**0.679**	0.637	0.722	0.014	271.80
LaM/LaI	49	**2.505**	2.279	2.747	0.096	123	**2.358**	2.108	2.565	0.083	99.79
LaInf/LaI	49	**1.467**	1.344	1.589	0.056	126	**1.393**	1.236	1.556	0.062	54.14
M^3M^3/LaI	49	**1.998**	1.838	2.172	0.074	125	**1.894**	1.602	2.103	0.083	58.22
M^3M^3/LCb	49	**0.454**	0.434	0.475	0.011	122	**0.435**	0.370	0.468	0.015	67.40
LaM/LCb	49	**0.569**	0.544	0.590	0.010	122	**0.542**	0.512	0.576	0.012	207.50
LaInf/LCb	49	**0.333**	0.281	0.356	0.012	123	**0.319**	0.292	0.348	0.011	53.16
ANc/LCb	48	**0.375**	0.349	0.397	0.011	122	**0.351**	0.322	0.380	0.012	146.57
ACr/LCb	42	**0.477**	0.445	0.509	0.014	109	**0.454**	0.420	0.499	0.014	76.10

Table 25. Basic biometric data on type specimens in the genus *Eptesicus* Rafinesque, 1820, under discussion. For abbreviations of measurements see pp. 10, 11; abbreviations of the taxa names: *anatol.* = *Eptesicus anatolicus* Felten, 1971, *hingst.* = *E. hingstoni* Thomas, 1919, *innesi* = *Vesperugo innesi* Lataste, 1887, *bottae* = *Vesperus bottae* Peters, 1869, *bottae** = specimen of *E. bottae* from Saudi Arabia (not a type, see Nader & Kock 1990b), *taftan.* = *Eptesicus bottae taftanimontis* de Roguin, 1987, *omanen.* = *E. bottae omanensis* Harrison, 1975, *intermed.* = *E. serotinus intermedius* Ognev, 1927, *sodalis* = *Vespertilio sodalis* Barrett-Hamilton, 1910, *pasht.* = *E. serotinus pashtonus* Gaisler, 1970

name	*anatol.*	*hingst.*	*innesi*	*bottae*	*bottae**	*taftan.*	*omanen.*	*shiraz.*	*intermed.*	*sodalis*	*pasht.*
coll.	SMF	BMNH	BMNH	MNHN	SMF	MNHG	BMNH	BMNH	ZMMU	BMNH	BMNH
no.	36478	19.3.1.1.	19.7.7.3528	1987-297	73811	1703.100	79.162	74.11.21.31	S29296	4.4.6.1.	69.786
sex	f	–	f	m	m	f	m	f	m	m	f
LAt	45.8	45.5	–	41.2	41.7	42.8	39.3	–	51.3	46.2	51.7
LCr	18.29	16.43	16.34	16.39	16.08	16.80	15.22	22.30	20.15	19.28	20.19
LCb	17.77	16.18	15.75	16.07	15.82	16.50	14.74	21.48	19.45	18.12	19.58
LaZ	12.78	11.57	10.62	10.98	10.72	10.92	10.24	14.98	13.42	–	15.15
LaI	3.94	3.87	4.02	3.87	3.62	3.58	3.48	4.39	4.22	4.43	4.52
LaInf	5.88	5.62	5.42	5.02	5.17	5.28	4.67	–	6.31	6.13	6.71
LaN	8.54	8.22	7.94	7.75	7.53	7.83	7.47	9.74	9.22	9.28	9.87
LaM	10.15	9.12	9.07	8.76	8.48	8.72	8.02	11.69	10.68	10.01	11.33
ANc	6.58	6.10	5.97	5.94	5.82	5.60	5.35	7.14	6.27	6.74	6.91
ACr	8.43	–	7.57	7.37	7.43	7.38	7.07	8.46	7.67	8.06	8.24
CC	5.80	5.68	5.18	5.12	5.06	4.97	4.56	–	6.33	6.44	6.70
P^4P^4	6.57	6.34	5.93	5.81	5.72	5.96	5.33	–	6.87	7.43	7.38
M^3M^3	8.22	7.28	7.10	7.27	7.11	7.25	6.38	–	8.35	8.72	9.17
IM^3	8.01	–	6.72	7.11	7.10	7.17	6.47	9.75	8.95	8.47	9.11
CM^3	6.75	6.11	5.82	6.02	5.92	6.17	5.48	8.43	7.65	7.38	7.52
P^4M^3	5.37	4.83	4.75	4.93	4.88	4.98	4.32	6.61	5.82	5.68	6.02
M^1M^3	4.42	3.74	3.79	3.88	3.88	3.90	3.54	5.28	4.63	4.65	4.58
LMd	13.23	12.25	11.76	11.93	11.57	11.97	11.12	16.97	15.07	–	15.23
ACo	4.98	4.39	4.28	4.28	3.97	4.32	3.88	6.38	5.63	–	5.94
IM_3	8.40	7.36	7.17	7.35	7.33	7.43	6.73	10.38	9.52	–	9.57
CM_3	7.45	6.50	6.39	6.62	6.57	6.63	5.98	9.37	8.46	–	8.54
P_4M_3	5.73	5.12	5.01	5.22	5.27	5.23	4.75	7.31	6.37	–	6.68
M_1M_3	4.93	4.28	4.33	4.42	4.42	4.42	3.91	5.88	5.30	–	5.49

smaller than between those of *anatolicus* type and others. When we compare the above described bacula with those of different populations of *E. serotinus*, the *anatolicus* type creates a transition between those of *serotinus* and the desert *bottae* populations (Figs. 86, 99).

The coloration of individual populations differs in the tinge of the pelage (Figs. 87, 105, 106), however the general figure of coloration of individual hairs is congruent in all the populations compared; dorsal hairs are tri-coloured and ventral hairs bi-coloured. In the Syrian *anatolicus*, the tinge of dorsal pelage is rusty brown, ventral side is whitish-beige; naked parts are dark brown to blackish brown; basal parts of the dorsal hairs ($^1/_4$–$^1/_2$ of hair length) are brown, medial parts

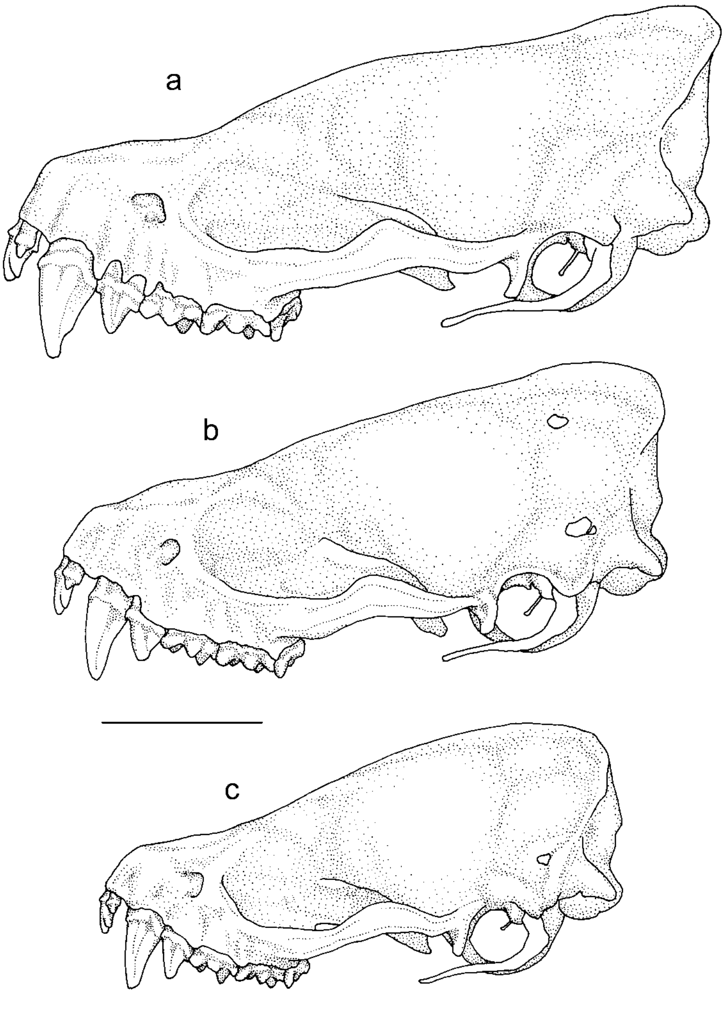


Fig. 103. Skulls of Syrian representatives of the genus *Eptesicus* Rafinesque, 1820: a – *E. serotinus* (Schreber, 1774) (male, NMP 48987, Maalula), b – *E. anatolicus* Felten, 1971 (female, NMP 48901, Baniyas), c – *E. bottae* (Peters, 1869) (male, NMP 48965, Rasafah). Part I. Lateral views. Scale bar = 5 mm.

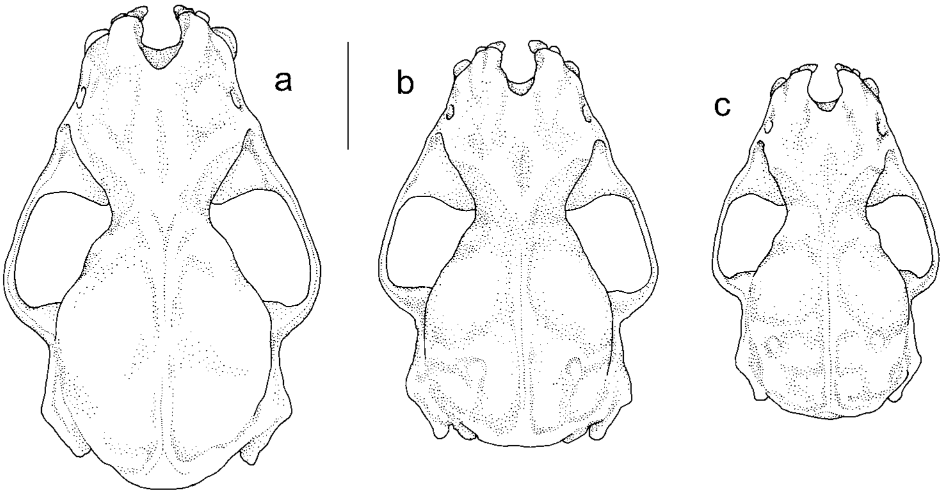


Fig. 103. (continued) Part II. Dorsal views. Scale bar = 5 mm.

(ca. 1/4) beige and distal parts (ca. 1/3) are rusty brown; basal parts of the ventral hairs (ca. 1/2) are greyish-brown, distal parts beige. Persian individuals have a bit greyish tint of both dorsal and ventral pelage. In the Syrian *hingstoni*, the tinge of dorsal pelage is greyish-beige, ventral side is

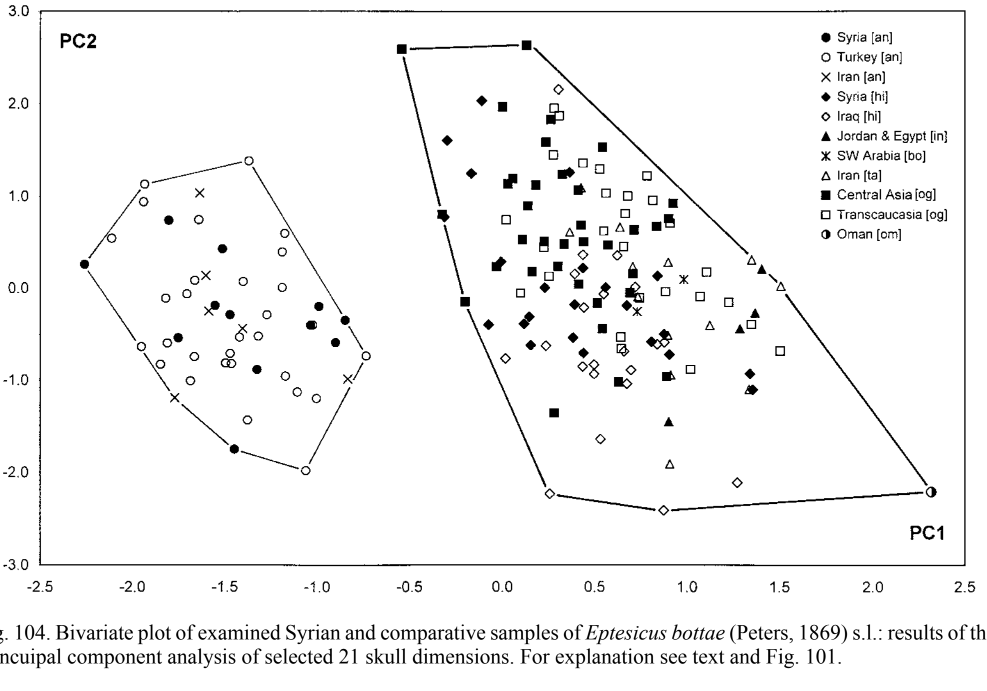
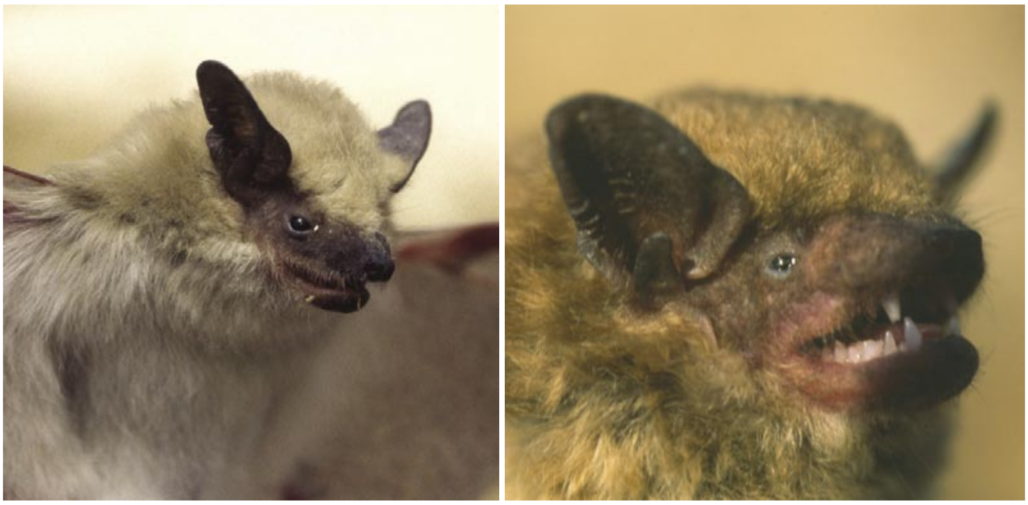


Fig. 104. Bivariate plot of examined Syrian and comparative samples of *Eptesicus bottae* (Peters, 1869) s.l.: results of the princuipal component analysis of selected 21 skull dimensions. For explanation see text and Fig. 101.



Figs. 105, 106. Portraits of Syrian individuals of smaller forms of the genus *Eptesicus* Rafinesque, 1820. 105 (left) – *Eptesicus bottae* (Peters, 1869) from Balis. 106 (right) – *Eptesicus anatolicus* Felten, 1971 from Qala'at al Marqab (both photos by A. Reiter).

creamy; naked parts are greyish-brown to pale brown; basal parts of the dorsal hairs (ca. $^1/_3$) are brown, medial parts (ca. $^1/_4$) are beige to creamy and distal parts are greyish-brown; basal parts of the ventral hairs (ca. $^1/_2$) are brown, distal parts creamy. In the Central Asian *ognevi*, the tinge of dorsal pelage is rusty beige, ventral side is whitish-beige to creamy; naked parts are pale brown; basal parts of the dorsal hairs (ca. $^1/_2$) are dark brown, medial parts (ca. $^1/_5$–$^1/_4$) are beige and distal parts (ca. $^1/_3$) are rusty brown; basal parts of the ventral hairs (ca. $^1/_2$) are greyish-brown, distal parts whitish-grey to creamy. The Transcaucasian *ognevi* is a bit paler, the tinge of their dorsal pelage is beige, naked parts are greyish-brown to brown. In the Persian *taftanimontis*, the tinge of dorsal pelage is rusty brown, ventral side is greyish-beige; naked parts are dark brown; basal parts of the dorsal hairs (ca. $^1/_2$) are brown, medial parts (ca. $^1/_5$–$^1/_4$) are beige and distal parts (ca. $^1/_3$) are rusty brown; basal parts of the ventral hairs (ca. $^1/_2$) are brown, distal parts greyish-white to creamy. Although the tinge probably varies within populations, in our compared samples the gradient from the darkest to the palest was as follows, (1) both Persian and Syrian *anatolicus*, (2) *taftanimontis*, (3) Central Asian and Transcaucasian *ognevi* and Syrian *hingstoni* are of approximately the same tinge, although they did differ slightly. With the exception of *taftanimontis*, which is of a slightly similar pelage coloration as the Syrian *anatolicus*, all other compared desert *bottae* populations differ from *anatolicus*, being paler both in general coloration of pelage and naked parts.

In summary, based on the morphological evidence presented here, populations of *anatolicus* seem to represent a separate species different from all other populations of *E. bottae*. The biogeographic as well as ecological data support this conclusion (see above); clear differences between the two forms in echolocation calls were also observed (von Helversen 1998, Holderied et al. 2005), giving support to their separation at species level.

Variation of desert populations *Eptesicus bottae*. Based on simple comparisons of body and skull dimensions as well as the PC analysis (see above), all the desert *bottae* populations (*bottae* s.s., *higstoni*, *innesi*, *ognevi*, *taftanimontis*) compose a single common cluster, except for the type specimen of *omanensis* which does not fall in it. However, in skull ratios *omanensis* showed similar values as all other desert *bottae* samples (Tables 23, 25). This fact may suggest that *omanensis* should represent a separate species similarly as it has been shown in *anatolicus*, however, additional material as well as a more profound analysis of the *omanensis* population is needed for any relevant statement.

After the values elimination of the most differing taxa, *anatolicus* and *omanensis*, from the matrix of *bottae* samples, PC analysis did not select any distinct population within the compared skulls. Although it selected only 12 significant measurements important for differentiation of the samples (LCr, LCb, LMd, all tooth-rows with the exception of M^1M^3, and ratios CC/CM^3, CM^3/LCb), the analysis grouped all these samples into one cluster (Fig. 107; PC1=62.52, PC2=20.71% of variance). These results suggest that the variation within the *bottae* group, composed of the nominative taxa *bottae*, *hingstoni*, *innesi*, *ognevi*, and *taftanimontis*, is not as high as the current view on their separate taxonomic statuses does predict. Within this group of populations, certain differences were demonstrated only in the rostrum shape. Central Asian and also Transcaucasian samples (i.e. all *ognevi* samples) showed a relatively longer and narower rostral part of the skull (higher values in CM^3/LCb ratio, and lower in M^3M^3/LCb), and a relatively narrower rostrum both in its mesial and distal parts (lower CC/CM^3 and M^3M^3/CM^3) than in other populations compared (Fig. 108; Table 23). On the other hand, Syrian and Iraqi samples (i.e. all *hingstoni* samples) showed a relatively short and wide rostral part of the skull (lower CM^3/LCb, and higher M^3M^3/LCb), and a relatively wide rostrum both in its mesial and distal parts (higher CC/CM^3 and M^3M^3/CM^3). The sample from southeastern Iran (*taftanimontis*) showed a central position

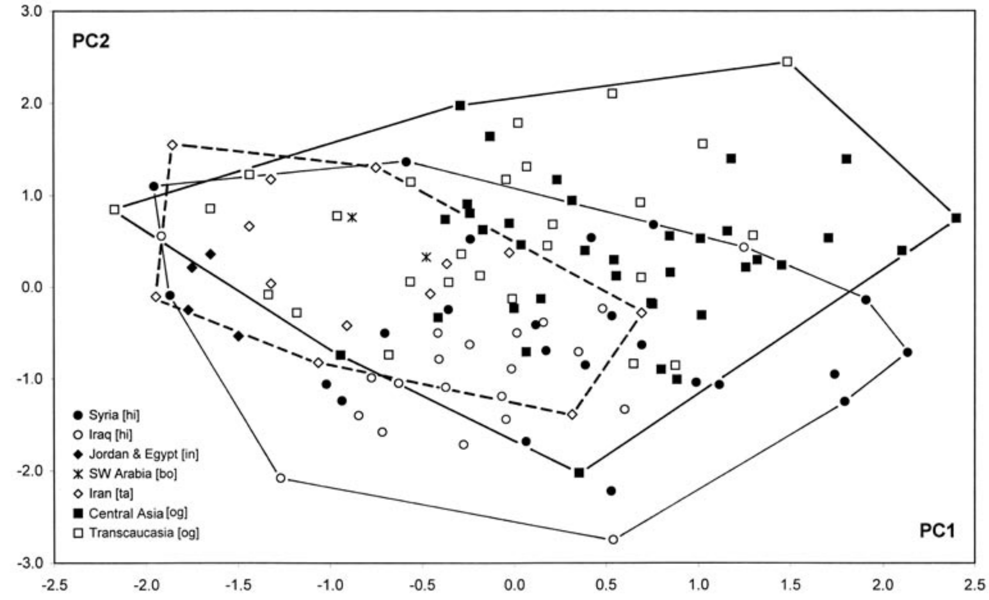


Fig. 107. Bivariate plot of examined Syrian and comparative samples of *Eptesicus bottae* (Peters, 1869) s.s. (as in the Fig. 101, without the samples of *E. anatolicus* Felten, 1971 and *E. b. omanensis* Harrison, 1975): results of the principal component analysis of selected 12 skull dimensions. Explanation: thin-lined polygon = Mesopotamian samples (n=44), i.e. *E. b. hingstoni* Thomas, 1919; bold-lined polygon = samples of Transcaucasia and Central Asia (n=60), i.e. *E. b. ognevi* Bobrinskoj, 1918; dashed-polygon = Baluchestani samples (n=13), i.e. *E. b. taftanimontis* de Roguin, 1987; in brackets acronyms of the taxa: hi = *hingstoni*; in = *innesi*; bo = *bottae*; ta = *taftanimontis*; og = *ognevi*.

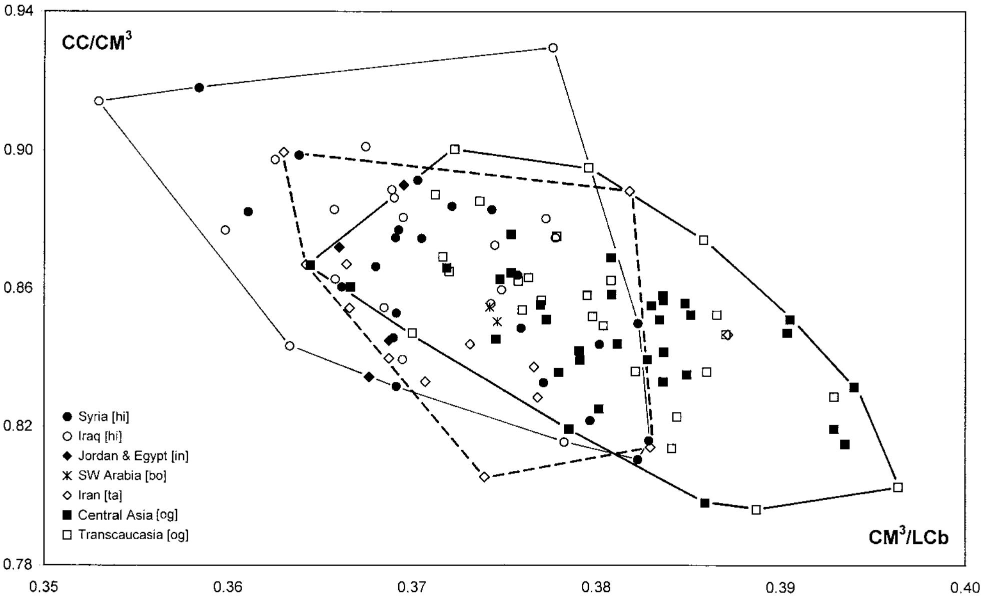


Fig. 108. Bivariate plot of examined Syrian and comparative samples of *Eptesicus bottae* (Peters, 1869) s.s.: relative length of rostrum (CM^3/LCb) against the relative width of rostrum (CC/CM^3). For explanation see Fig. 107.

of transition between the above mentioned two rostrum morphotypes. The small sample of true *bottae* from southwestern Arabia also showed a transitional position between two morphotypes, but with slightly higher values of the relative width of rostrum and distal relative width of rostrum (M^3M^3/LCb, M^3M^3/CM^3); the limited sample from Jordan and Egypt (*innesi*) demonstrated a slight similarity with that of *hingstoni* in its rostral shape ratios.

Furthermore, as shown above, the Persian *taftanimontis* differs in its pelage coloration among other *bottae* populations, being a bit darker in its dorsal tinge.

FEEDING ECOLOGY. *Eptesicus bottae* is a small to medium-sized bat with a slow hawking foraging strategy (Norberg & Rayner 1987, Korine & Pinshow 2004). Hymenoptera, Lepidoptera and Coleoptera were reported to be the most important prey items in this species in the Dead Sea area of Palestine (Feldman et al. 2000).

We analysed three samples of faeces of *E. bottae* from Syria and our results (Fig. 109) show Coleoptera to be the most important prey category followed by Heteroptera and Auchenorrhyncha. Contents of several digestive tracts were also studied. Analysis of the digestive tracts of two individuals collected at Khazneh showed results similar to the analysis of faeces collected at the same place (see Fig. 109), but also proved a presence of several further insect groups (Neuroptera, Brachycera, Blattodea and Trichoptera). One digestive tract collected at As Salihiyyah on 18 June 1998 contained mainly Lepidoptera and Orthoptera (each item per 40% of volume), plus Mantodea (20%). Another one collected at the same place on 16 May 2001 contained only a few parts of insect bodies, all of Auchenorrhyncha. A specimen collected at Balis on 13 May 2001 fed on Auchenorrhyncha (40% of volume), plus Coleoptera, Heteroptera and Lepidoptera (each item covered approx. 20%).

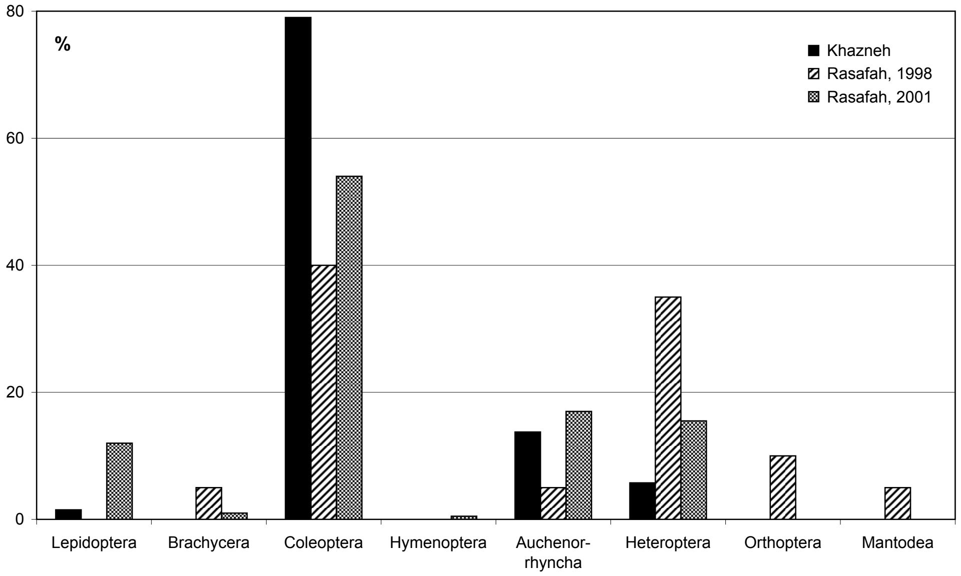


Fig. 109. Volume of particular food items in the diet of *Eptesicus bottae* (Peters, 1869) from Syria.

Our results from Syrian Mesopotamia are quite different from those obtained by Feldman et al. (2000) from the Palestinian deserts. Representatives of Hymenoptera were nearly absent in our samples and the volume of Lepidoptera was much lower. These conspicuous differences in the representation of the main prey categories show high feeding flexibility in *E. bottae*.

Eptesicus anatolicus **Felten, 1971**

RECORDS. **Original data**: Al Lathiqiyeh: Qala'at Salah ad Din [1], gorge under the castle, 14 October 2004: net. 1 ma, 1 fs. – Hama: Qala'at Sheisar [2], castle ruins, 1 July 1998: obs. fa+j (coll. 1 mj); 31 May 2001: obs. colony of 5 ad. inds. and three solitary males (coll. 2 ma, 4 faG, 1 faL). – Tartus: Baniyas [3], above a creek, 31 May 2001: net. 2 faG; – Qala'at al Marqab [4], castle ruins, 1 June 2001: obs. colony of 7 inds. (coll. 1 ma).

DISTRIBUTION. **General and the Near East** (Fig. 92). *Eptesicus anatolicus* is an endemic species to the Near East. It occurs in Mediterranean habitats of southern Asia Minor, Syria, northern Iraq and southwestern Iran (DeBlase 1980, Nader & Kock 1990b, Benda & Horáček 1998, our data). Generally, the distribution range of *E. anatolicus* is a belt stretching along the southern slopes of the Anatolian and Persian ranges from the southeastern Aegean Sea to the Strait of Hormoz.

Most records of *E. anatolicus* come from southern and southwestern Anatolia (Felten 1971, Kumerloeve 1982, Nader & Kock 1983c, 1990b, Spitzenberger 1994, Benda & Horáček 1998). One record has been published from the Euphrates Valley (Obuch 1994), however, confirmation of species identification is needed in this record (*E. bottae* could be also taken in consideration). The Turkish range of *E. anatolicus* extends westwards to the Greek island of Rhodes (von Helversen 1998).

In Iraq, there are only two records available from Ser'Amadia and Kani Mase, both close to the Turkish border (Harrison 1956a). Both records (four bats) were primarily identified as *E. serotinus turcomanus* (Harrison 1956a, c, 1964a). Later, Harrison (1975) showed these individuals to be *E.*

anatolicus. DeBlase (1980) reported on four records of *E. anatolicus* from southwestern Iran, some of these were formerly assigned to different other taxa (Thomas 1905, 1919, Cheesman 1921, etc., see Nader & Kock 1990b). Our unpublished records from southern and southwestern Iran have confirmed and enlarged the range outlined by DeBlase (1980), respectively; see Appendix II.

Syria (Fig. 93). *E. anatolicus* is a rather rare bat in Syria, four records are available (Table 1). The species is here reported from Syria for the first time. It occurs exclusively in the Mediterranean woodland zone of the northwestern part of the country associated with the Jebel An Nusariyah Mts, where its range connects that of Cilicia, Turkey (Kumerloeve 1982, Nader & Kock 1990b, Spitzenberger 1994, Benda & Horáček 1998). At present, the records from the castle ruins of Qala'at Sheisar and Qala'at al Marqab [2, 4] represent a southern margin of the species range in the western part of the Near East. However, the occurrence in Mediterranean habitats in Lebanon and/or in northern Palestine as well as in the Golan Heights is quite possible, but it needs to be confirmed.

FIELD NOTES. Two roosts of *Eptesicus anatolicus* were found in Syria. In the ruined castle of Qala'at Sheisar (Fig. 24), a colony was observed in May 2001, while in July 1998 only one female with a juvenile was found (perhaps a rest of a dispersed colony). The colony roosted in a crevice between stones of the ceiling vault of a second-floor room in the dungeon in the centre of the castle area. The room was fully lightened by sunshine. Another colony was discovered in a similar roost in the ground-floor room of the main keep of Qala'at al Marqab. The castle also hosted a solitary male which was found in a building in the northwestern part of the ruins. These roosts well conform with those more numerously documented by Spitzenberger (1994) from the populations of southern Turkey. *E. anatolicus* was netted at two places in Syria, in both cases above a stream. Two individuals were captured above a small reservoir on a creek at Baniyas and two individuals in a gorge below Qala'at Salah ad Din.

E. anatolicus shared the roosts with *H. savii* and *R. ferrumequinum* (Qala'at Sheisar) and with *M. blythii*, *M. myotis* and *M. nattereri* (Qala'at al Marqab). However, only *H. savii* was found in the same room. During a netting session at Baniyas, also *P. pipistrellus* and *P. kuhlii* were captured, and at Qala'at Salah ad Din, calls of *T. teniotis*, *P. kuhlii* and *P. pipistrellus* were recorded along with the netting of *E. anatolicus*.

One post-partum female and four pregnant females were collected from the colony discovered on 31 May 2001 in Qala'at Sheisar. Each of the pregnant females contained two foeti of the crown-rump length varying between 15 and 18 mm (mean 16.5 mm). Each of the two pregnant females netted at Baniyas on the same day contained two foeti of the length of 19 mm. The colony observed in Qala'at al Marqab on 1 June 2001 was unfortunately not examined. The juvenile male collected in Qala'at Sheisar on 1 July 1998 (the female escaped) was almost full-grown with LAt of 42.8 mm (= 88.9% of the mean from adults). From these data it seems likely that births in Syria occur at the break of May and June.

E. anatolicus was not recorded in owl diet in Syria, although it was found in the pellets of *Strix aluco* from Turkey (Obuch 1994, Benda & Horáček 1998).

MATERIAL EXAMINED. 2 fa (NMP 48900, 48901 [S+A]), Baniyas, 31 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma (NMP 48918 [S+B]), Qala'at al Marqab, 1 June 2001, leg. M. Andreas, A. Reiter & D. Weinfurtová; – 1 ma, 1 fs (NMP 90287, 90288 [S+A]), Qala'at Salah ad Din, 14 October 2004, leg. R. Lučan; – 2 ma, 1 mj, 5 fa (NMP 48075 [A], 48893–48899 [S+A]), Qala'at Sheisar, 1 July 1998, 31 May 2001, leg. P. Benda & A. Reiter.

MORPHOLOGY. See Table 23 and Appendix III for biometric data on the Syrian specimens of *Eptesicus anatolicus*. The bacula extracted from Syrian specimens of *E. anatolicus* are shown in Fig. 99. For comments see Taxonomy under *E. bottae* chapter.

Taxonomy. *Eptesicus anatolicus* is here regarded a separate species endemic for the Near East. Although it was primarily described as a separate species (Felten 1971), it has mostly been considered a subspecies of *E. bottae* (Harrison 1975, Corbet 1978, DeBlase 1980, Nader & Kock 1983c, 1990b, Pavlinov & Rossolimo 1987, 1998, Harrison & Bates 1991, Koopman 1993, 1994, Spitzenberger 1994, Borisenko & Pavlinov 1995, Benda & Horáček 1998, von Helversen 1998, Horáček et al. 2000, Simmons 2005, etc.). However, morphological evidence has clearly shown it to be a separate form. See under *E. bottae* for details of the taxonomic analysis, for the dimensions of Syrian samples of *E. anatolicus* and comparative materials see Table 23.

Throughout the range of *E. anatolicus* from Turkey through Syria to Iran, no evidence of geographical variation has been found either in morphology, metric traits or coloration (see also Table 23). Thus, this species is monotypical and does not create subspecies.

Von Helversen (1998) questioned a possible conspecificity of the forms *anatolicus*, *sodalis* and/or *isabellinus* (see Taxonomy under *E. serotinus* and *E. bottae* for details on these forms). As the individuals of *E. anatolicus* are much larger than those of *E. bottae*, they are close in size to the smallest subspecies of *E. serotinus*, i.e. *E. s. turcomanus* from Central Asia and *E. s. isabellinus* from the Maghreb. *E. anatolicus* and *E. s. isabellinus* actually slightly overlap in skull dimensions, see Tables 22, 23 and Fig. 110. However, *E. s. isabellinus* is here considered as a subspecies of *E. serotinus*, which occurs in sympatry with *E. anatolicus* in the Near East, thus we cannot agree with a possibility of such conspecificity in this concept. This problem could be probably solved only with the help of a genetic analysis, which would show real relations of these three populations (see also comments on taxonomy under *E. serotinus*). But theoretically,

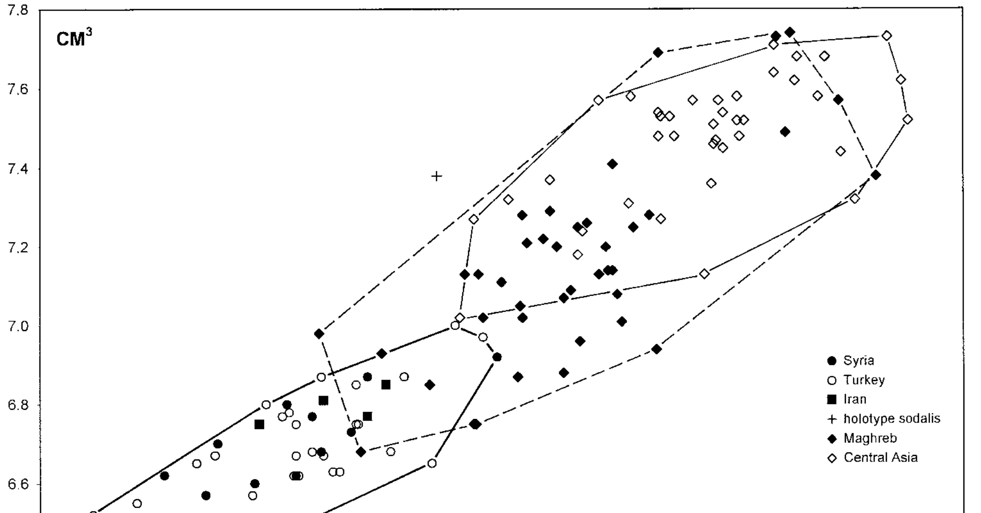


Fig. 110. Bivariate plot of examined Syrian and comparative samples of selected taxa of the genus *Eptesicus* Rafinesque, 1820: condylobasal length of skull (LCb) against the length of upper tooth-row (CM^3). Explanation: bold-lined polygon = *E. anatolicus* Felten, 1971 (n=49); thin-lined polygon = *E. serotinus turcomanus* (Eversmann, 1840) (n=43); dashed polygon = *E. s. isabellinus* (Temminck, 1840) (n=40).

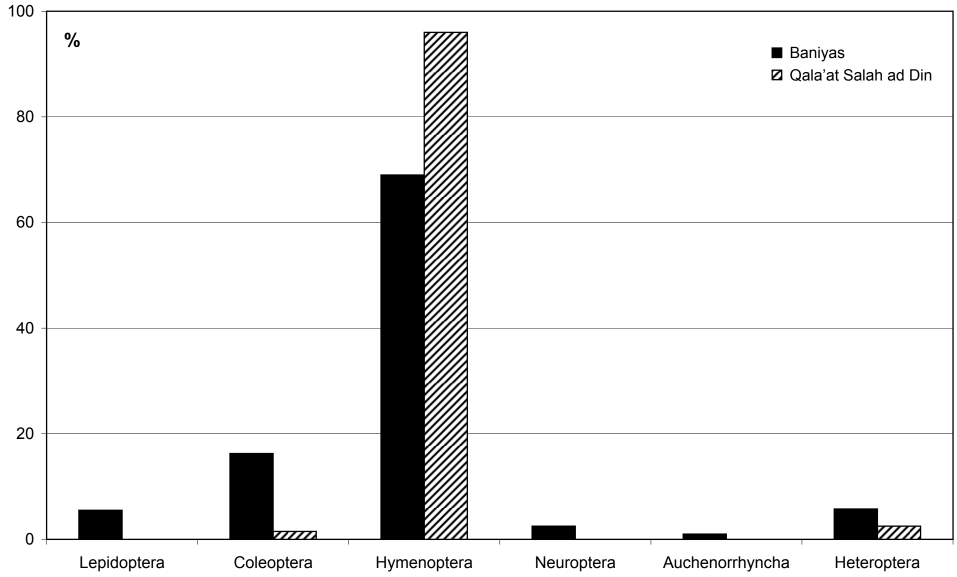


Fig. 111. Volume of particular food items in the diet of *Eptesicus anatolicus* Felten, 1961 from Syria.

the pair of populations here named *E. anatolicus* and *E. s. isabellinus* should represent a similar complex of close forms as the couple of *Plecotus* bats: *P. teneriffae gaisleri* (North Africa) and *P.* '*t.*' *kolombatovici* (Near East) have shown close genetic relations and have similar distributional pattern as *E. s. isabellinus* and *E. anatolicus* (see Benda et al. 2004c, Spitzenberger et al. 2006).

The taxon *Vespertilio sodalis* Barrett-Hamilton, 1910 was considered a separate European species, *Eptesicus sodalis*, however, only three individuals have been assigned to this form so far (Barrett-Hamilton 1910, Miller 1912, Bauer 1968). The examined type specimen of this name, coming from Buştenari, Romania, has shown dimensions close to lower variation margin of the examined sample of *E. s. serotinus* and overlapping with variation ranges of the samples of smaller forms of *E. serotinus* (*isabellinus* and *turcomanus*) – see Tables 22, 23, 25 and Figs. 88, 89, 110. Due to these facts and also due to geographic reasons, we consider the name *V. sodalis* to be a junior synonym of the name *Vespertilio serotinus* Schreber, 1774, similarly as several previous authors did (Kuzjakin 1950, 1965, Gaisler 1970, Hanák & Gaisler 1971, Corbet 1978, Ruprecht 1990).

FEEDING ECOLOGY. *Eptesicus anatolicus* is a medium-sized bat (see above), reported to feed mainly on Scarabaeidae and Orthoptera (Benda et al. 1999b).

We analysed two samples of faeces (Fig. 111) of *E. anatolicus* from Syria, and found Hymenoptera to be the fairly the most important diet item. Results of the digestive tract analysis of a specimen collected at the Qalat Marqab castle were quite different. We found 70% of its volume to be comprised of Brachycera and 30% of Heteroptera. Previous data regarding the diet composition of this species and the present results are rather inconsistent and the matter needs further studies in order to be able to describe the trophic ecology of *E. anatolicus*.

Hypsugo savii (Bonaparte, 1837)

Records. **Original data**: Al Lathiqiyeh: Hayalien [1], above a temporary water pit, 1 June 2001: net. 5 ma; – Slinfeh [2], above a temporary water pit, 29 June 1998: net. 9 ma. – Dimashq: Barqash [3], small cave in a valley under ancient ruins, 26 May 2001: net. 2 faG; – Bloudan [4], ca. 1550 m a. s. l., 25 June 1998: det. min. 2 inds.; – Maalula [5], cave, 30 April 2001: net. 1 ma; – Yabroud [6], cave in an escarpment above the town, 26 June 1998: net. 1 ma; above a rocky wall, 5 October 2004: det. 1 ind. – Halab: Qatura [7], necropolis, 2 June 2001: net. 1 faG, 6 faL (coll. 1 faG, 2 faL). – Hama: Qala'at Sheisar [8], castle ruins, 1 July 1998: coll. 1 fa. – Quneitra / Golan Heights: Camp Faouar [9], 1980: 1 fj (specimen in NMW). – **Published data**: Quneitra / Golan Heights: Mount Hermon and Golan, two unidentified records mapped in northern part of this region [Mount Hermon and roughly the area of Mas'adah], 18–20 June 1995, several specimens netted, incl. two lactating females (Mendelssohn & Yom-Tov 1999).

Distribution. **General**. *Hypsugo savii* is a species with the Mediterranean type of distribution (Corbet 1978, Horáček & Hanák 1986, Koopman 1994, Horáček & Benda 2004). It occurs in the Canary and Cape Verde Islands and the Maghreb, in southern Europe from Iberia to the Balkans (incl. some Mediterranean islands) and Crimea, northernmost records coming from the southern part of Central Europe (Germany, Czech Republic, Slovakia, and Hungary); in Asia its range continues over Transcaucasia and the Near East to Central Asia and Eastern Turkestan (Horáček et al. 2000, Horáček & Benda 2004). Several occasional records of *H. savii* have been reported from some northern European harbours (see Horáček & Benda 2004).

Near East. *H. savii* is rather rarely found bat in the Near East, although the range outlined by the known records cover most of the Mediterranean habitats of Turkey, western Iran and the Levant

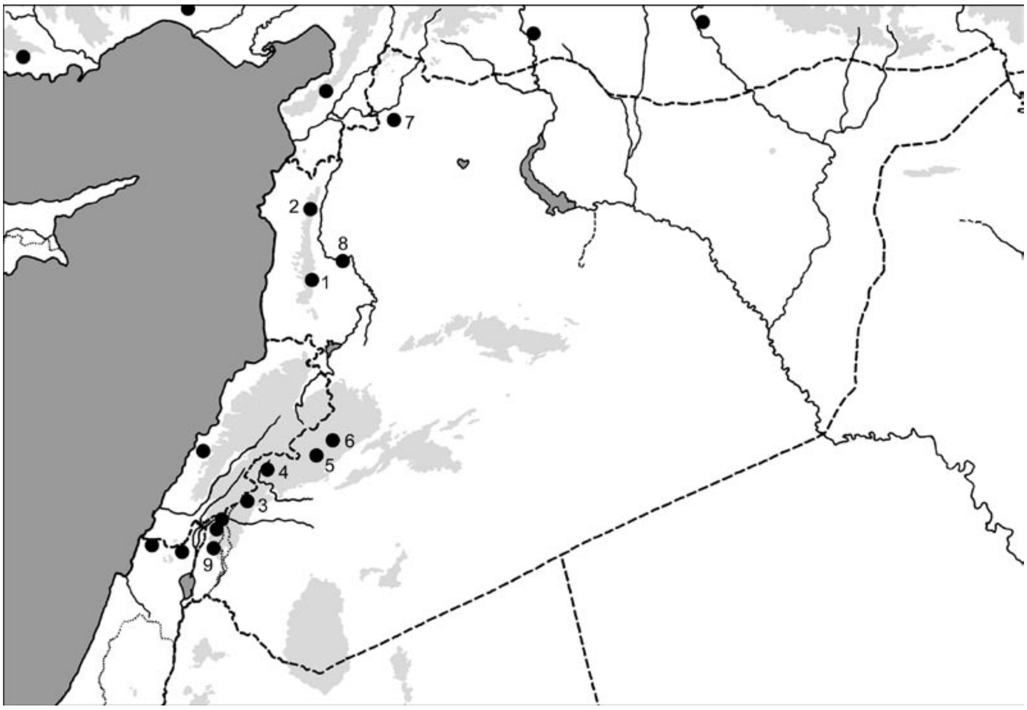


Fig. 112. Records of *Hypsugo savii* (Bonaparte, 1837) in Syria and surrounding areas.

(DeBlase 1980, Harrison & Bates 1991, Benda & Horáček 1998, our data). In the Near East and the Maghreb, *H. savii* reaches southern margins of its distribution range.

Even though the number of records of *H. savii* in Turkey seems to be a bit scarce, the species probably inhabits almost the whole territory of the country, including both the Mediterranean and central steppe regions (Osborn 1963, von Helversen 1989, Ibáñez & Fernández 1989, Albayrak 1990a, 1993a, Obuch 1994, Benda & Horáček 1998, Yiğit et al. 2006, Karataş & Sachanowicz in press). Only one finding of this bat has been reported from Lebanon, at Ainab close to the sea shore (Harrison 1961). In Palestine, *H. savii* was recorded only twice, near Kibutz Eilon (Makin & Harrison 1988, Makin 1989), and at an unnamed site in the Upper Galilee (Mendelssohn & Yom-Tov 1999, Ferguson 2002).

H. savii remains unknown from the territories of Iraq and Jordan (Harrison & Bates 1991, Amr et al. 2004), however, several records of this bat are available from Cyprus (Harrison 1961, our unpubl. data). Three records of *H. savii* have been reported from the mountains of western Iran (DeBlase 1971, 1980).

Syria (Fig. 112). *H. savii* is a medium-frequent bat in Syria, 11 records are known from the country (Table 1). In Syria, it was previously known only from the Golan Heights (Mendelssohn & Yom-Tov 1999). From Syria *proper*, this species is here mentioned for the first time. The mention of 'Syria' by Horáček et al. (2000) referred to several our records [2, 4, 6, 8] preliminary reported by Benda et al. (1999a). All the records of *H. savii* come from the Mediterranean woodland and steppe-maquis zones of Syria where they connect a few of the Palestinian and Turkish Levantine findings (Osborn 1963, Obuch 1994, Benda & Horáček 1998, Mendelssohn & Yom-Tov 1999, Karataş & Sachanowicz in press).

A rather high number of Syrian records suggests a common distribution of *H. savii* in the entire Mediterranean part of the Levant, both in the wooded Jebel An Nusariyah Mts as well as in the rather deforested Anti-Lebanon Mts and Orontes Valley. However, all these areas are rich in rocky walls and escarpments, the habitats preferred by *H. savii*. In this respect, the scarcity of records in the adjacent areas of the Holy Land and Lebanon in the south and in Hatay, Cilicia and Upper Mesopotamia in the north seems to be based on insufficient research effort using appropriate methods (netting, detectoring).

FIELD NOTES. The only roost of *Hypsugo savii* in Syria was found in the ruins of Qala'at Sheisar (Fig. 24), where a female was hidden in a ceiling crevice of a second-floor room in the castle dungeon (it shared the room with a colony of *E. anatolicus* and the ruins with *R. ferrumequinum*). Most of the records of this species were made by netting; a male was caught at the opening of a large cave/overhang in cliffs above the oasis of Yabroud (Fig. 37; together with *P. macrobullaris* and *M. nattereri*, and calls of *T. teniotis* were recorded). Above a water pit at Slinfeh, eight individuals were netted (along with *P. pipistrellus* and *E. serotinus*). One male was caught in a net installed at the entrance to a small cave in the cliff above Maalula (also with *E. serotinus*, *P. pipistrellus* and *P. macrobullaris*; Fig. 86). Two females were captured at a small overhang/cave in the valley below the ancient ruins of Barqash (Fig. 36). Near Hayalien, above a temporary water pit, five males were netted (along with *E. serotinus*). Seven individuals were caught above a water pit close to the necropolis of Qatura (together with *P. kuhlii*; Fig. 113).

The sites of occurrence of *H. savii* in Syria lie at the altitudes from 250 m (Qala'at Sheisar) to 1440 m (at Barqash), their mean altitude being 1071.0 m. Besides its known presence in the Orontes valley, this species represents an obvious mountain element among Syrian bats, the second most manifested after *Plecotus macrobullaris*.

Each of the two pregnant females collected at Barqash on 26 May 2001 carried two foeti of the crown-rump length of 11–13 mm. A week later, on 2 June 2001, among seven bats collected at

Qatura, only one pregnant female was present (with two foeti 18 mm long), while six females were lactating. Mendelssohn & Yom-Tov (1999) reported netting of two lactating females on 19 and 20 June 1995 near Mount Hermon. These data indicate the occurrence of births in the Levant at the break of May and June. Aşan Baydemir & Albayrak (2006) found a pregnant female of *H. savii* in central Turkey even later, in June, however, this region has a more continental climate than the Levantine part of the Mediterranean.

Although Obuch (1994) reported findings of *H. savii* remnants in the diet of *Strix aluco* from two sites in southern Turkey, this bat was not found in the diet of any owl species in Syria.

Material examined. 2 fa (NMP 48868 [S+B], 48869 [S+A]), Barqash, 26 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 fs (NMW AB90/513 [S+B]), Camp Faouar, 1980, leg. K. Kollnberger; – 5 ma (NMP 48949–48923 [S+A]), Hayalien, 1 June 2001, leg. P. Benda; – 1 ma (NMP 48980 [S+A]), Maalula, 30 April 2001, leg. J. Obuch; – 1 fa (NMP 48076 [S+A]), Qala'at Sheisar, 1 July 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 3 fa (NMP 48932–48934 [S+A]), Qatura, 2 June 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 9 ma (NMP 48064–48068, 48070–48072 [S+A], 48069 [S+B]), Slinfeh, 29 June 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 1 ma (NMP 48048 [S+A]), Yabroud, 26 June 1998, leg. M. Andreas, P. Benda & M. Uhrin.

Morphology. See Table 26 and Appendix III for biometric data on the Syrian specimens of *Hypsugo savii*. The baculum from the specimen of *H. savii* from Syria is shown in Fig. 99. This preparation does not differ from those of European populations published by Lanza (1959a) and Horáček & Benda (2004) or from Lebanon by Hill & Harrison (1987) and/or Harrison & Bates (1991), respectively.

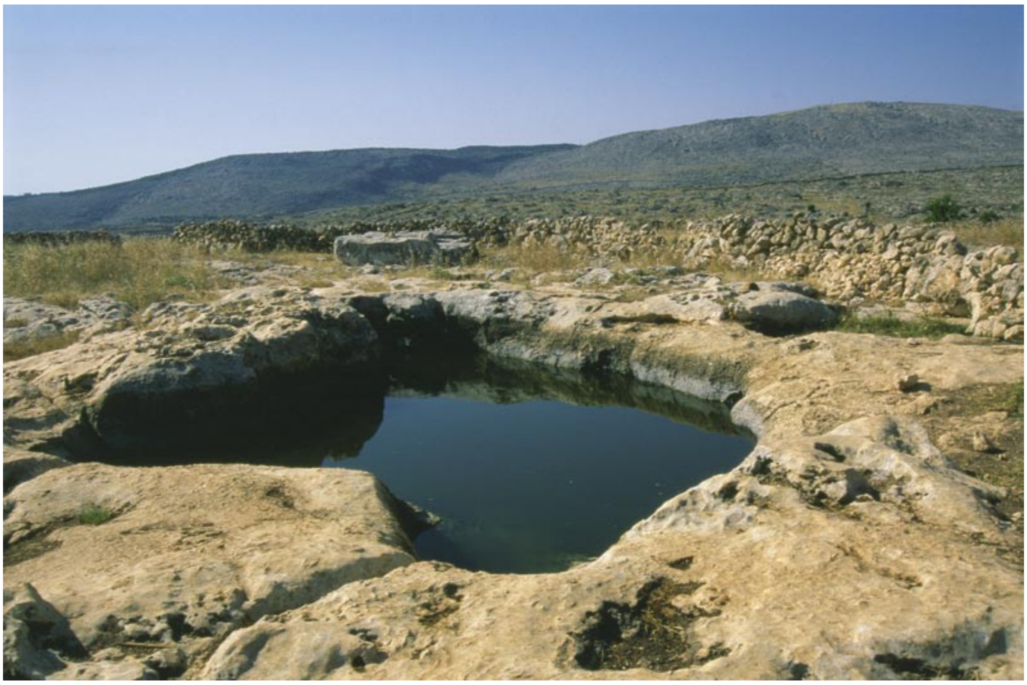


Fig. 113. Water pit in the area of necropolis at Qatura. Above the pit, numerous individuals of *Hypsugo savii* and *Pipistrellus kuhlii* were netted, while a male and a female of *Rhinolophus ferrumequinum* were caught at a tomb entrance in the necropolis (photo by A. Reiter).

TAXONOMY. *Hupsugo savii* is considered to be rather a polytypic species (Corbet 1978, Horáček & Hanák 1986, Koopman 1994, Horáček et al. 2000, Simmons 2005), several subspecies have been recognised within its rank; viz. *H. s. savii* (Bonaparte, 1837) (terra typica: Pisa [Italy]), *H. s. caucasicus* (Satunin, 1902) (t.t.: Tiflis [= Tbilisi, Georgia]), and *H. s. austenianus* (Dobson, 1871) (t.t.: Cherrapunjee, Khasi Hills, Assam [= Meghalaya, NE India]). However, the status of the latter form is rather uncertain, as it is known only from the type and has been only provisionally assigned to *H. savii* (cf. Corbet & Hill 1992, Bates & Harrison 1997, Bates et al. 2005). Several authors (Bauer 1956a, Horáček & Hanák 1986, Horáček et al. 2000, Simmons 2005) recognised another subspecies from the western Mediterranean, *H. s. ochromixtus* (Cabrera, 1904) (t.t.: Menorca, Alvoco de Serra de Estrella, Portugal, Sierra de Guadarrama, Sevilla, and Madrid, Spain), but others (Corbet 1978, Palmeirim 1990, Koopman 1994, Horáček & Benda 2004) keep its status rather open. Another form, *H. alashanicus* (Bobrinskoj, 1926) (t.t.: Hotyn-gol Valley, near Dyn'-juan'-in, western slope of the Alašan Range [Mongolia]), formerly a part of the *H. savii* taxonomic content, is currently considered to represent a separate species (Horáček & Hanák 1986, Tiunov 1997, Horáček et al. 2000, Simmons 2005).

Ferguson (2002: 67) expressed a bit surprising opinion concerning the taxonomy of the genus *Hypsugo* in the Near East. He considered the species *Hypsugo bodenheimeri* (Harrison, 1960) to be a smaller desert subspecies of *H. savii*: "Its [of *H. bodenheimeri*] dentition is nearly the same as that of *P*[*ipistrellus*]. *savii* [= *Hypsugo savii*], which is variable; its small size and pale coloration are adaptations to the desert; there is no significant morphological gap between *P.*

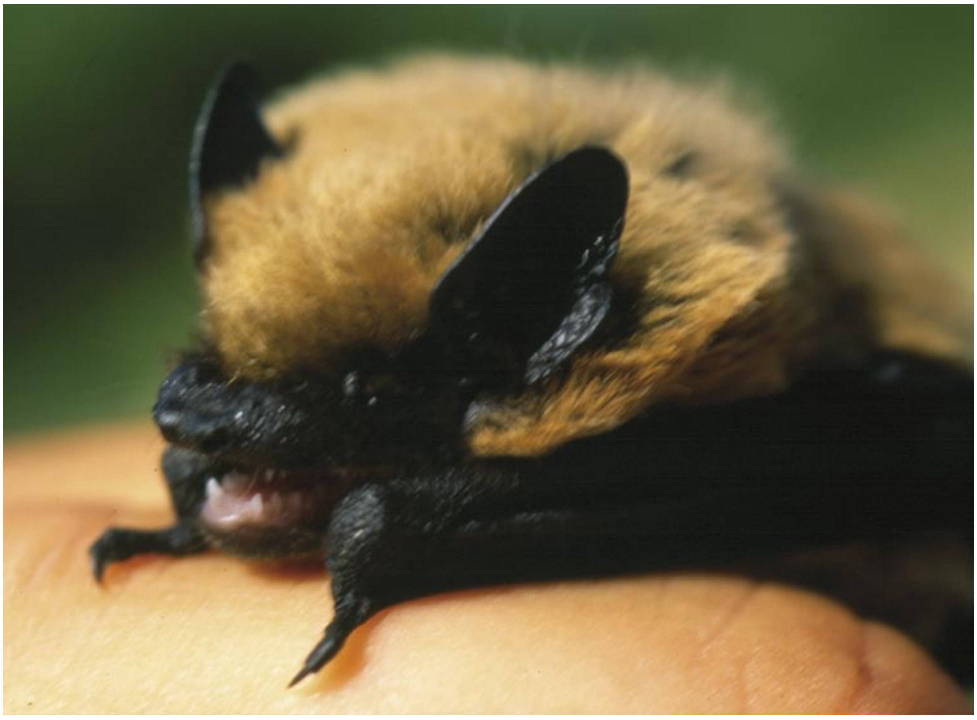


Fig. 114. Portrait of *Hypsugo savii* (Bonaparte, 1837) from near Barqash (photo by A. Reiter).

Table 26. Basic biometric data on examined Syrian and comparative samples of *Hypsugo savii* (Bonaparte, 1837). For abbreviations see pp. 10, 11

	Syria					Middle East (other than Syria)					Transcaucasia				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	23	**34.21**	32.1	36.5	1.096	23	**33.88**	31.3	36.5	1.107	4	**33.65**	32.2	35.6	1.561
LCr	23	**13.53**	13.06	14.08	0.271	22	**13.47**	12.90	13.93	0.290	7	**13.46**	13.20	13.78	0.224
LCb	23	**13.17**	12.66	13.67	0.302	22	**13.09**	12.43	13.61	0.321	6	**12.95**	12.45	13.47	0.354
LaZ	21	**8.74**	8.30	9.27	0.264	23	**8.72**	8.36	9.14	0.207	7	**8.54**	8.07	8.85	0.319
LaI	23	**3.48**	3.23	3.83	0.132	23	**3.45**	3.16	3.68	0.122	7	**3.58**	3.37	3.70	0.111
LaN	23	**6.74**	6.45	6.95	0.127	23	**6.68**	6.44	6.97	0.147	7	**6.76**	6.60	6.90	0.098
ANc	22	**4.52**	4.20	4.81	0.159	22	**4.51**	4.27	4.73	0.105	6	**4.62**	4.50	4.75	0.101
CC	22	**4.32**	4.02	4.76	0.165	23	**4.29**	3.98	4.71	0.174	1	**4.16**	–	–	–
M^3M^3	22	**5.75**	5.54	6.12	0.151	23	**5.84**	5.59	6.13	0.148	0	–	–	–	–
CM^3	23	**4.62**	4.42	4.82	0.105	23	**4.61**	4.28	4.74	0.115	6	**4.51**	4.40	4.68	0.093
LMd	23	**9.54**	9.12	9.89	0.233	23	**9.44**	8.97	9.93	0.265	8	**9.39**	8.90	9.70	0.303
ACo	22	**2.83**	2.58	3.01	0.106	23	**2.83**	2.61	3.06	0.104	1	**3.17**	–	–	–
CM_3	23	**4.93**	4.71	5.13	0.121	23	**4.93**	4.58	5.12	0.134	1	**4.87**	–	–	–

	Balkans & Crete					Southern Italy					Maghreb				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	66	**33.73**	31.2	37.0	1.160	0	–	–	–	–	1	**35.30**	–	–	–
LCr	71	**13.43**	12.71	14.07	0.292	38	**13.44**	13.05	14.18	0.227	12	**13.90**	13.47	14.50	0.310
LCb	71	**13.03**	12.38	13.73	0.314	40	**13.01**	12.60	13.35	0.208	12	**13.59**	13.03	14.33	0.340
LaZ	67	**8.73**	8.30	9.54	0.231	34	**8.86**	8.55	9.70	0.245	11	**9.10**	8.68	9.65	0.292
LaI	73	**3.50**	3.11	3.82	0.149	42	**3.46**	3.25	3.68	0.097	12	**3.55**	3.00	3.80	0.220
LaN	71	**6.74**	6.21	7.97	0.244	42	**6.80**	6.40	7.30	0.228	12	**6.94**	6.60	7.25	0.201
ANc	70	**4.57**	4.19	4.85	0.148	40	**4.49**	4.10	4.85	0.147	12	**4.56**	4.38	4.82	0.140
CC	72	**4.28**	3.80	5.33	0.217	31	**4.34**	4.12	4.73	0.172	12	**4.47**	4.25	4.64	0.137
M^3M^3	72	**5.78**	5.32	6.22	0.184	29	**5.78**	3.90	6.15	0.398	12	**6.02**	5.75	6.35	0.196
CM^3	72	**4.56**	4.26	4.92	0.131	33	**4.60**	4.40	4.80	0.112	12	**4.86**	4.66	5.16	0.156
LMd	73	**9.47**	9.03	10.08	0.238	41	**9.71**	9.30	10.57	0.223	12	**9.93**	9.55	10.35	0.265
ACo	41	**2.85**	2.52	4.83	0.343	0	–	–	–	–	12	**3.16**	2.80	3.40	0.196
CM_3	72	**4.88**	4.57	5.26	0.133	29	**4.88**	3.00	5.20	0.397	12	**5.19**	4.93	5.50	0.171

bodenheimeri and *P. savii* and it is nowhere sympatric. It therefore appears that *P. bodenheimeri* is a geographical and ecological subspecies of *P. savii*. It is suggested, therefore, that it be known as *Pipistrellus savii bodenheimeri* n. status." However, such opinion is quite isolated while the separate species status of *H. bodenheimeri* has been broadly accepted (Harrison 1961, 1964a, Corbet 1978, Qumsiyeh 1985, 1996, Menu 1987, Harrison & Bates 1991, Yom-Tov et al. 1992a, b, Koopman 1993, 1994, Gaucher & Harrison 1995, Al-Jumaily 1998, Mendelssohn & Yom-Tov 1999, Amr 2000, Horáček et al. 2000, Riskin 2001, Amr et al. 2004, Simmons 2005, etc.). Besides the apparent differences in body and skull size, *H. savii* differs totally from *H. bodenheimeri* in coloration of the pelage and naked parts, in the shape of baculum and in ecological requirements (e.g., Harrison 1960, 1982, Harrison & Bates 1991).

The populations of *H. savii* in the Near East, Transcaucasia and Central Asia have been generally assigned to the form *H. s. caucasicus* by a plenty of authors (Kuzjakin 1950, 1965, Ellerman & Morrison-Scott 1951, Harrison 1961, 1964a, Lewis & Harrison 1962, Strelkov 1963, 1981, Neuhauser & DeBlase 1974, Kumerloeve 1975b, Atallah 1977, Corbet 1978, DeBlase 1980, Butovskij et al. 1985, Horáček & Hanák 1986, de Roguin 1988, Harrison & Bates 1991, Koopman

1994, Rakhmatulina 1995, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Horáček et al. 2000, Ferguson 2002, Horáček & Benda 2004, etc.). The main differences between the West Asian subspecies *caucasicus* and the nominotypical one from Europe are supposed to include the paler (mainly dorsal) pelage coloration and the stronger tendency to lack the small upper premolar P^3 (Kuzjakin 1950, 1965, Harrison 1961). The European populations should be therefore darker and with small upper premolars present (although they are reported for a long time to be extramely variable in coloration, see e.g. Bonaparte 1837, Miller 1912).

The dorsal pelage in *caucasicus* has been described to be dark brown to blackish with yellowish, sandy and/or golden hair tips, and the ventral pelage to be greyish brown on base with yellowish white to silverish tips (Satunin 1902, Ognev 1927, 1928, Kuzjakin 1950, 1965, Harrison 1961, 1964a, Strelkov 1963). Although the analyses of pelage coloration in the European populations showed a broad variation compared to the described state in the Asian populations (see above), the paler coloration of dorsal hair tips with a yellowish tinge seems to prevail (Kahmann 1958a, Dulic 1978, Arlettaz et al. 1993). Kahmann (1958a) found 65% of the evaluated specimens (total n=43) to bear 'Cream Buff' coloured dorsal hair tips, most of the rest of the sample was only slightly darker ('Ochraceous Buff', 18.6%) and only a minute part was significantly darker ('very dark Vandyke Brown', 16.4%). Dulic (1978) found 66% of the analysed bats from the Adriatic islands (n=106) to have dorsal hair tips of 'lighter ochraceous, ochraceous buff, whitish ochraceous or light rufous with a few of ochraceous tone'; while 17% of the sample were with 'rufous-ochraceous, darker or lighter rufous' dorsal hair tips, 14.2% of the sample with 'silver or greyish ochraceous' dorsal hair tips and only 2.8% of the total sample were found to be 'dark vandyke-brown without lighter tips'. An extensive sample of 254 bats coming from southern France and Switzerland was analysed by Arlettaz et al. (1993); they found 77.6% of this number to bear brown dorsal pelage with beige, blond or golden hair tips. On the other hand, 22% of bats of their sample were found unicolor (red, auburn, chestnut brown, or anthracite) and only one individual was grey with silver tips on its dorsum.

Similarly, the analysed European samples of *H. savii* displayed variation in the second main character which has been reported to be subspecifically different from the Asian ones, i.e. presence/absence of the small premolars in both upper jaws. In the West Asian form, *H. s. caucasicus*, the absence of P^3 is reported to be frequent, but not absolute. Harrison (1961) observed total absence of P^3 in three specimens from Lebanon, while Strelkov (1963) and Kuzjakin (1965) concluded that P^3 was "mostly missing" or "missing almost always" in the *caucasicus* populations of Crimea, Caucasus, Central Asia and Kazakhstan. Strelkov et al. (1978) found only one small upper premolar P^3 in four specimens from Turkmenistan. On the other hand, also the analysis of samples of the European form, *H. s. savii*, showed the absence of the small upper premolar to be rather usual. The tooth analysis of the specimens from the Adriatic islands made by Dulić & Mrakovcić (1984) showed that 10% of males and 43% of females lacked the P^3. For Bulgarian populations, Horáček & Benda (2004) reported the absence of the small upper premolars in 22% of males (n=26), while it was present in all examined females (n=9).

The examined samples of *H. savii* from Syria generally exhibited the only coloration pattern (Figs. 114, 115). Both the dorsal and ventral pelages are bi-coloured; the proximal two-thirds of dorsal hairs are dark brown, distal parts dark beige, the latter colour giving the overall tinge to the dorsal pelage coloration. Proximal halves of the ventral hairs are dark brown, while their distal parts are creamy. Naked parts are very dark brown. The unicoloured morphs of *H. savii* have been observed neither in Syria nor in other parts of the Middle East (our findings, Harrison 1961, DeBlase 1980). Such coloration was also described by von Helversen (1989) in samples from Asia Minor and the Aegean islands: "a beautiful sandy golden back with long silky fur contrasting with black ears and muzzle".

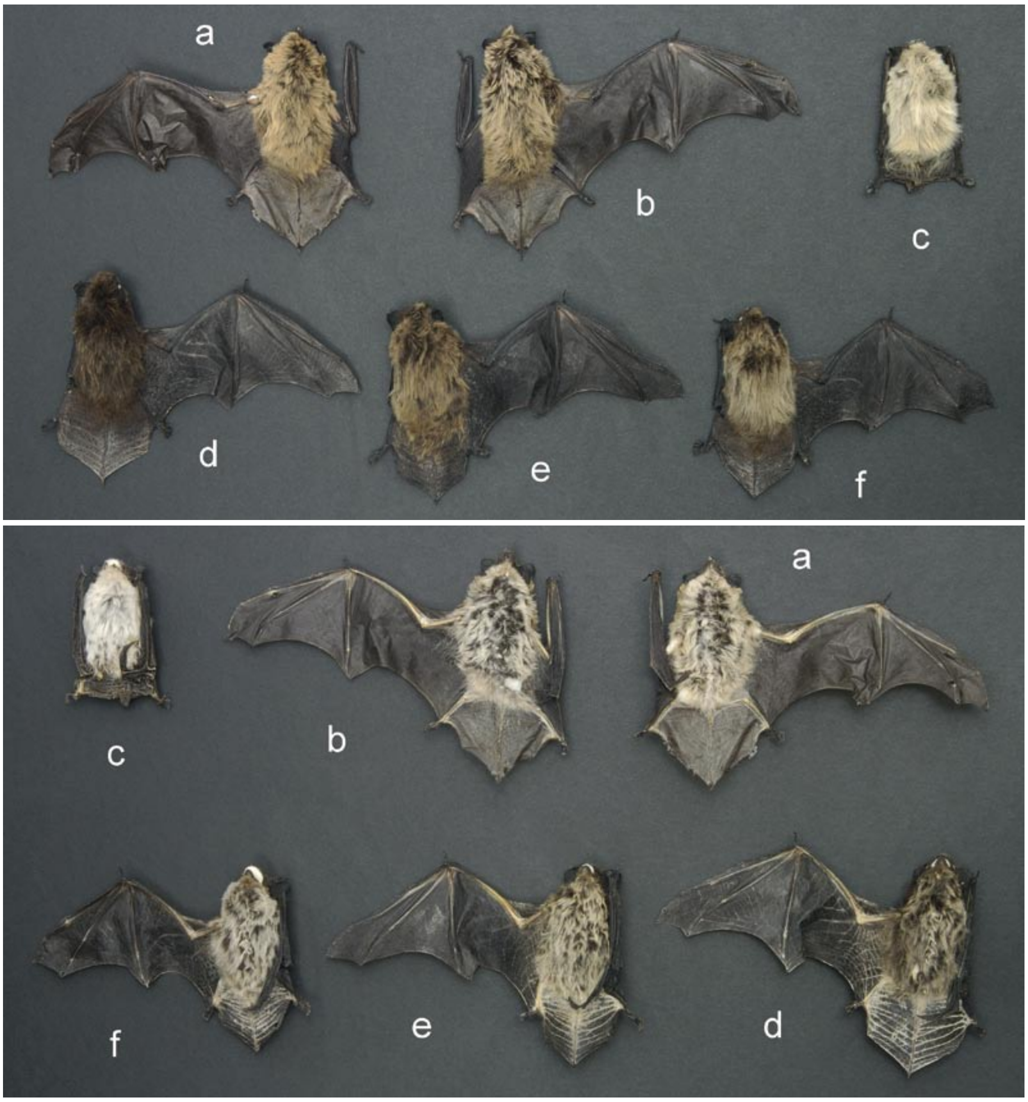


Fig. 115. Pelage coloration in *Hypsugo savii* (Bonaparte, 1837) (above – dorsal views, below – ventral views): a – female, NMP 48868, Syria, Barqash; b – male, NMP 48069, Syria, Slinfeh; c – male, NMP 91342, Azerbaijan, Gobustan; d – male, NMP 48692, Greece, Thassos Is.; e – male, NMP 48571, Greece, Micro Papiggo; f – male, NMP 48693, Greece, Thassos Is.

The analysis of dental characters in the Middle Eastern samples of *H. savii* (Table 27) showed the prevailing presence of small upper premolars in these populations. Regardless of sample size, at least 60% of the specimens (both males and females) in all populations bear at least one P^3 in its upper jaw.

Table 27. Small upper premolar (P^3) presence in Syrian and other Middle Eastern samples of *Hypsugo savii* (Bonaparte, 1837)

		both P^3 present		one P^3 present		both P^3 absent	
	Σ n	n	%	n	%	n	%
Syria	22	12	54.5	4	18.2	6	27.3
Lebanon	15	11	73.3	0	0.0	4	26.7
Cyprus	5	3	60.0	0	0.0	2	40.0
NE Iran	3	2	66.7	0	0.0	1	33.3
Middle East	45	28	62.2	4	8.9	13	28.9
males	37	23	62.2	3	8.1	11	29.7
females	7	4	57.1	1	14.3	2	28.6

To conclude, the differences between European and West Asian populations seem to be of a smaller extent than reported before. Although the coloration of the Middle Eastern populations has been found to be characteristic and uniform, this coloration type is most common also in European *H. savii*. The tendence to oligodoncy of P^3 showed a more or less identical percentage of occurrence in both populations. The differences in skull and/or body size between European and Middle Eastern samples noted by some authors (e.g. Kuzjakin 1950, DeBlase 1980) have not been proved (see Table 26). Therefore, we consider the states of morphological characters mentioned to be typical of European and of Middle Eastern populations rather as examples of an extremely broad variation than as an evidence of distinctness useful for subspecific division. According to this opinion, we regard the Syrian populations of *H. savii* to belong to the nominotypical form.

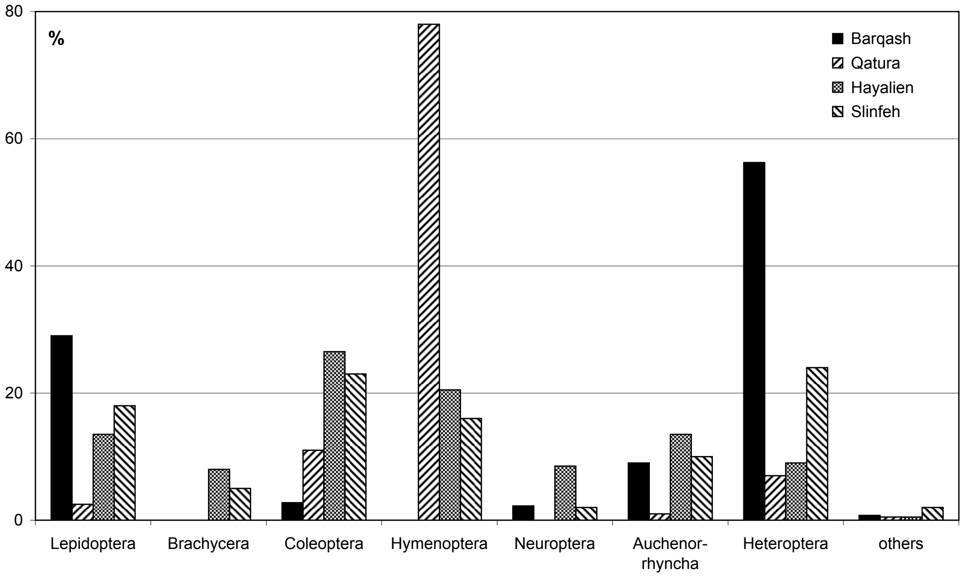


Fig. 116. Volume of particular food items in the diet of *Hypsugo savii* (Bonaparte, 1837) from Syria.

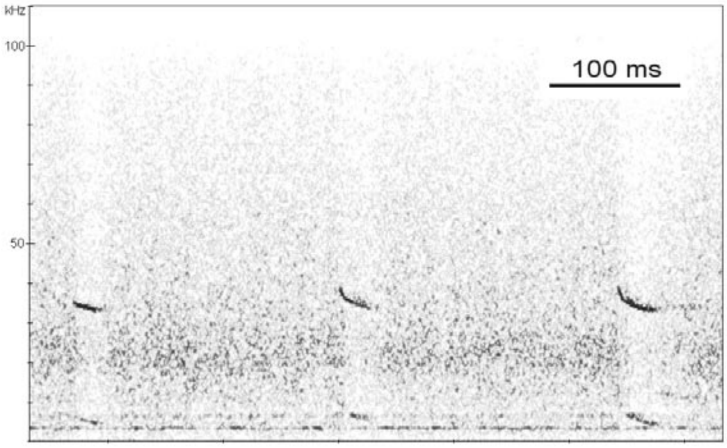


Fig. 117. Spectrogram of echolocation calls of *Hypsugo savii* (Bonaparte, 1837). An individual flying in an uncluttered space at Yabroud.

Feeding ecology. *Hypsugo savii* is a small bat flying relatively high up in open area; it hunts especially swarming insects. Lepidoptera, Diptera, Hymenoptera and Neuroptera were found to be the prevailing food items in Switzerland (Beck 1995), Homoptera, Heteroptera and smaller representatives of Lepidoptera in the Balkans and in Central Asia (Bauerová in Horáček & Benda 2004).

We analysed four samples of faeces of *H. savii* from the western part of Syria and recorded quite a considerable local variation (Fig. 116). Hymenoptera, Heteroptera, Coleoptera and Lepidoptera were the most important prey items. Our observations and the results of diet analysis show that *H. savii* is a typical aerial hawker.

Echolocation. Echolocation recordings of *Hypsugo savii* were made at one site in Syria (Yabroud, 5 October 2004; Fig. 117). Only two echolocation sequences from one individual were obtained and analysed (see Table 15). The observed individual was foraging around rock cliffs above the town of Yabroud (Fig. 37). Echolocation parameters of *H. savii* fell within the range described by several other authors in European populations (e.g., Zingg 1988, Russo & Jones 2002, Obrist et al. 2004).

Pipistrellus pipistrellus (Schreber, 1774)

Records. **Original data**: Al Lathiqiyeh: Jabla [1], city, 15 October 2004: det. display call of one male; – Kassab [2], border crossing-point, lavatory building, 3 July 1998: obs. nurs. colony (coll. 1fj) (cf. Benda et al. 2003a); – Al Lathiqiyeh [3], 1910: 3 fa (specimens in MNHN); – Qala'at Salah ad Din [4], gorge under the castle, 14 October 2004: det. min. 1 ind. – Ar Rawda near Rabi'ah [5], above a cistern, 1 July 1998: net. 2 fa (cf. Benda et al. 2003a); 2 July 1998: 1 ind. from *Strix aluco* pellet; – Ras al Bassit [6], above a creek, 29 April 2001: net. 1 faG (cf. Benda et al. 2003a), det. more inds.; 11–13 October 2004: det. several inds.; – Slinfeh [7], above a temporary water pit, 29 June 1998: net. 4 ma (cf. Benda et al. 2003a). – Dimashq: Bloudan [8], town, 5 May 2001: det. and obs. min. 10 flying inds.; – Maalula [9], cave, 30 April 2001: net. 4 ma (cf. Benda et al. 2003a); gorge, 3 October 2004: net. 1 ma, det. several inds.; – Sarghaya [10], gardens, 28 May 2001: net. 1 ma, 1 faG (cf. Benda et al. 2003a); – Yabroud [11], above an escarpment, 5 October 2004: det. several inds. – Homs: Qala'at al Hosn [12], ruins of Krak des Chevaliers, around castle ruins, 18 October 2004: det. 1 ind. – Tartus: Baniyas [13], above a creek, 31 May 2001: net. 1 faG (cf. Benda et al. 2003a). – **Published data**: Quneitra / Golan Heights: Mount Hermon and Golan, three unidentified records mapped in northern and central parts of this region [roughly the areas of Mount Hermon, Mas'adah and Katsrin], 19–20 June 1995, several specimens; Mount Hermon, 20 June 1995: 2 faL (Mendelssohn & Yom-Tov 1999).

Distribution. **General**. *Pipistrellus pipistrellus* is a species with a West Palaearctic type of distribution (Horáček et al. 2000, Mayer & von Helversen 2001b, Hulva et al. 2004, Taake & Vierhaus 2004). It occurs from the Maghreb, British Islands and southern part of Scandinavia, over southern and central Europe (incl. some Mediterranean islands), the Caucasus region, the Near East, and Afghanistan to southern regions of Central Asia, East Turkestan, and Kashmir (Bates & Harrison 1997, Horáček et al. 2000, Mayer & von Helversen 2001b, Benda et al. 2003a, 2004b, Hulva et al. 2004).

Near East. *P. pipistrellus* s.l. occurs in the Mediterranean part of the Near East. In the Near East and the Maghreb, this form reaches southern margins of its distribution range. Although most records of *P. pipistrellus* s.l. have not been revised for their accurate species identification, the prevailing number of identified records belongs to *P. pipistrellus* s. str. (Mayer & von Helversen 2001b, Benda et al. 2003a, Hulva et al. 2004). *P. pygmaeus* (Leach, 1825) has been found in the Near East only on two Aegean Islands, in Cyprus, and at the northwesternmost margin of Anatolia (Hanák et al. 2001, Stadelmann et al. 2004, Dietz et al. 2005), see Taxonomy for more details.

P. pipistrellus s.l. is the third most common bat form which has been found in Turkey (Benda & Horáček 1998). It is relatively common in the Mediterranean regions while the number of its records in Central and East Anatolian arid steppes is much smaller (Şadoğlu 1953, Osborn 1963, Çağlar 1965, von Lehmann 1966, Corbet & Morris 1967, Kock et al. 1972, DeBlase & Martin 1973, Kock 1974, Kumerloeve 1975a, Albayrak 1987, 1993a, 2003, Van Winden 1988, von Helversen 1989, Ibáñez & Fernández 1989, Obuch 1994, Steiner & Gaisler 1994, Benda & Horáček 1998, Benda et al. 2003a, Karataş et al. 2004, Taake & Vierhaus 2004, Yiğit et al. 2006). Based on acoustic analysis, *P. pipistrellus* s.s. has been confirmed in central and western Anatolia (Mayer & von Helversen 2001b).

In Lebanon, *P. pipistrellus* s.l. has been found only twice in the Bekaa Valley (Lewis & Harrison 1962). The only Palestinian specimen of this form comes from Mt. Meiron in the Upper Galilee (Makin 1989). Mayer & von Helversen (2001b) reported a genetic sample of *P. pipistrellus* s.s. from Israel (without any geographical details). In Jordan, *P. pipistrellus* (s.l.) has never been reported (see Amr et al. 2004), although Qumsiyeh et al. (1998) mentioned its possible occurrence there. Until now, this species has not been reported from Iraq (Harrison & Bates 1991).

P. pipistrellus s.l. occurs in the whole Mediterranean part of Iran (DeBlase 1980). Its records are abundant over the entire Zagros Mts as well as in the North Persian mountains (Thomas 1905, 1907, Etemad 1967, 1969, Lay 1967, Neuhauser & DeBlase 1971, DeBlase 1980, our unpubl. data). Hanák et al. (2001) have suggested a possible occurrence of *P. pipistrellus* s.s. in Cyprus.

Syria (Fig. 118). *P. pipistrellus* is a medium-frequent to common bat in Syria, 16 records are known from the country (Table 1). In Syria *s. str.*, this species was mentioned for the first time by Mendelssohn & Yom-Tov (1999) from the Golan Heights, and in Syria *proper*, it has been newly reported by Benda et al. (2003a). The 'Syria' mentioned by Horáček et al. (2000) refers to our three records from the Jebel An Nusariyah Mts [2, 5, 7] preliminary reported by Benda et al. (1999a). The species identification has been confirmed in most records by acoustic and/or genetic analyses (Mendelssohn & Yom-Tov 1999, Benda et al. 2003a), thus we consider all the Levantine mainland records to be assigned to *P. pipistrellus* s.s.

P. pipistrellus s.s. occurs in Syria exclusively in the Mediterranean woodland and steppe-maquis zones of the Levant. Its records come from both main Mediterranean ranges; nine records were made in the wooded areas of the Jebel An Nusariyah Mts [2, 4, 5, 7, 12] and along the sea coast [1, 3, 6, 13]. Seven findings are known from the rather deforested Anti-Lebanon Range [8–11], incl. the Golan Heights (Mendelssohn & Yom-Tov 1999). The record from the southern part of the Golan Heights represents the southernmost finding of this species in the Levant. The Syrian part of the range in the northwestern coastal region of the country connects the common occurrence of *P. pipistrellus* in Cilicia and Hatay, the area where it is one of the most abundant bats (Şadoğlu 1953, von Lehmann 1966, Kumerloeve 1975a, Van Winden 1988, Albayrak 1993a, Benda & Horáček 1998, Karataş et al. 2004, Taake & Vierhaus 2004).

FIELD NOTES. The only shelter of *Pipistrellus pipistrellus* in Syria was discovered under a tin roof of the lavatory building at the border check-point at Kassab, where a colony of an unidentified number of bats roosted. All other findings of *P. pipistrellus* in Syria were made by netting or recording of its calls. Above a water pit at Slinfeh, four individuals were netted (together with *E. serotinus* and *H. savii*; Fig. 85). Two adult females were caught in the net located above a small water reservoir, surrounded by a pine forest at Ar Rawda. Two individuals were netted above the Yahfufa river at Sarghaya (Fig. 119), in a centre of a valley covered with gardens and orchards (along with *M. nattereri*). At Baniyas, a female was captured above a small reservoir on a creek (plus *E. anatolicus* and *P. kuhlii*). At the entrance to a small cave in the cliff above Maalula, four males were netted (together with *E. serotinus*, *H. savii* and *P. macrobullaris*; Fig. 86) and one male was caught in a gorge close to Maalula. Above a creek in the centre of Ras al Bassit, a male was netted together with numerous individuals of *P. kuhlii*.

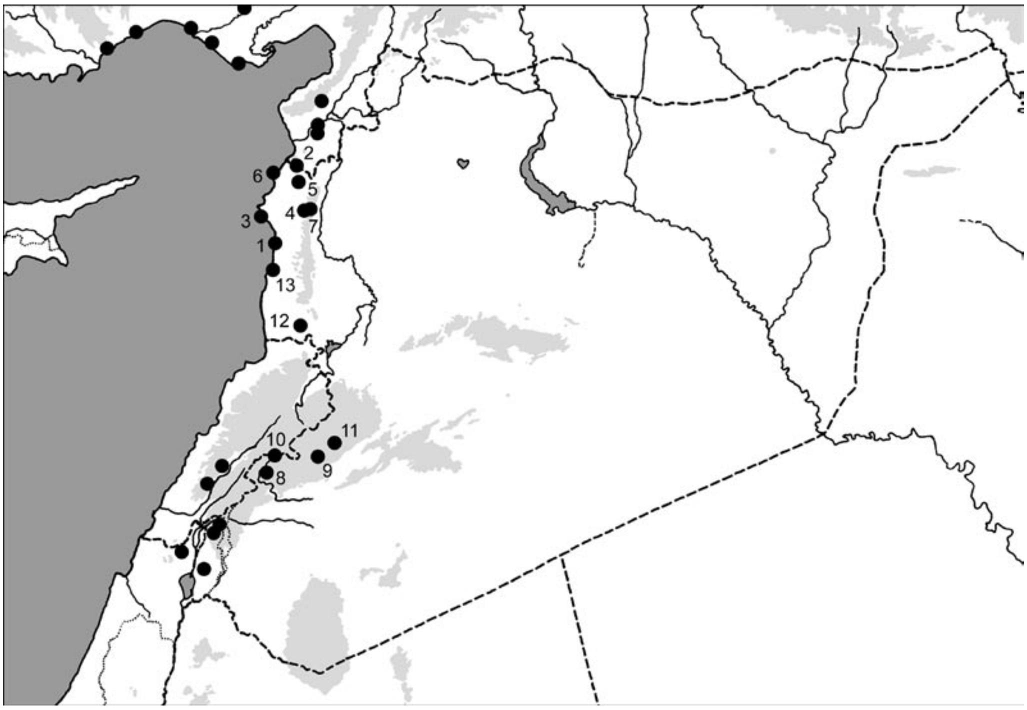


Fig. 118. Records of *Pipistrellus pipistrellus* (Schreber, 1774) in Syria and surrounding areas.

The pregnant female netted at Sarghaya on 28 May 2001, contained two foeti of the crown-rump length of 9 mm. Three days later at Baniyas the netted pregnant female carried also two foeti, their length was ca. 13 mm. A full-grown juvenile female (LAt 29.7 mm) was collected from the colony discovered on 2 July 1998 at Kassab. Mendelssohn & Yom-Tov (1999) reported finding of two lactating females on Mount Hermon on 20 June 1995. These data suggest possible timing of births in the Levant in early June.

P. pipistrellus was detected to be an exceptional item in owl diet in Syria, similarly as in Turkey or Iran (Obuch 1994, Obuch & Krištín 2004, Obuch unpubl.). Remains of one individual were found in a small sample of *Strix aluco* pellets from the pine forest at Ar Rawda. This only individual represented 1.69% of mammalian and 1.49% of all prey items in the respective sample.

Material examined. Baniyas, 31 May 2001, 1 fa (NMP 48902 [S+A]), leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 fs (NMP 48086 [A]), Kassab, 3 July 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 5 ma (NMP 48981–48984 [S+A], NMP 90279 [A]), Maalula, 30 April 2001, 3 October 2004, leg. R. Lučan & J. Obuch; – 3 fa (MNHN 1876-337A–C [A]), Lattakié (= Al Lathiqiyeh), 1910, leg. M. Deyrolle; – 2 fa (NMP 48084, 48085 [S+A]), Ar Rawda, 1 July 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 1 fa (NMP 49986 [S+A]), Ras al Bassit, 29 April 2001, leg. R. Lučan; – 1 ma, 1 fa (NMP 48871, 48872 [S+A]), Sarghaya, 28 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 4 ma (NMP 48060–48062 [S+A], 48063 [S+B]), Slinfeh, 29 June 1998, leg. M. Andreas, P. Benda & M. Uhrin.

Morphology. See Table 28 and Appendix III for biometric data on the Syrian specimens of *Pipistrellus pipistrellus*. The baculum extracted from Syrian *P. pipistrellus* is shown in Fig. 120. This preparation well correspond with those of the *P. pipistrellus* group published by Topál (1958), Lanza (1959a), Harrison (1982), Hill & Harrison (1987) and/or Benda et al. (2004b). All specimens of *P. pipistrellus* from Syria showed the *P. pipistrellus* pattern of wing veining (*sensu* Vierhaus 1996 and von Helversen & Holderied, 2003) but one bat (NMP 48084 from Ar Rawda), which bears the *P. pygmaeus* venation type in both wings. In several specimens (ca. $^1/_2$ from the whole number), a slight tendency to paling of the wing membrane margin was observable, however, no in such state known in *P. pipistrellus* from eastern parts of the Middle East.

Taxonomy. The specific content of the complex, formerly containing the only species, *Pipistrellus pipistrellus* s.l. (sensu e.g. Ellerman & Morrison-Scott 1951, Corbet 1978, Koopman 1993, 1994, etc.), has been recently rebuilt in its western Palaearctic range and three different species have been separated from its rank (Jones & van Parijs 1993, Barrat et al. 1997, ICZN 2003, Benda et al. 2004b), viz. *Pipistrellus pygmaeus* (Leach, 1825) (terra typica: Chew Valley Lake, Bath and North East Somerset, U.K.) and *P. hanaki* Hulva et Benda, 2004 (t.t.: Wadi al Kuf, Cyrenaica, Libya), along with *P. pipistrellus* (Schreber, 1774) s. str. (t.t.: Beauvais Cathedral, Normandy, France).

The rather scarce precise data on the specific affiliation of populations inhabiting the Middle East have shown mostly *P. pipistrellus* s. str. to be present in the region (Mayer & von Helversen 2001b, Benda et al. 2003a, Hulva et al. 2004, cf. von Helversen 1989, Mendelssohn & Yom-Tov 1999). The only exceptions are the records of *P. pygmaeus* in the most northwestern point of Asia Minor at the northern shore of the Manyas Lake (Dietz et al. 2005), on the Aegean islands of Rhodes and Lesbos (Hanák et al. 2001) and in Cyprus (Hanák et al. 2001, Stadelmann et al. 2004). In mainland Asia, *P. pipistrellus* s. str. was found in Anatolia, Syria, Palestine, Caucasus, Iran, and in Central Asia.

Taxonomic content of the newly re-defined species *Pipistrellus pipistrellus* is only poorly known (for a review see Horáček et al. 2000). Taake & Vierhaus (2004) and Simmons (2005) mentioned two subspecies within its rank, the nominotypical form and the paler race *P. p. aladdin* Thomas, 1905 (t.t.: Derbent, 50 mi. W of Isfahan, 6,500' [C Iran]). Taake & Vierhaus (2004) assigned the populations of southwestern Iran, Central Asia and with a question mark also those of Turkey to the latter form, while all those living west of this area to *P. p. pipistrellus*. On the other hand, Hulva et al. (2004), who analysed molecular traits in *P. pipistrellus* on a broad scale of the western Palaearctic, did not find any sharp genetic differences within its species rank but between populations of Eurasia and the Maghreb.

The name *Pipistrellus aladdin* which was formerly considered to assign a separate species (Thomas 1905, Tate 1942, Etemad 1967) or a synonym of various other species names (*P. coromandra*, *P. kuhlii*; Ellerman & Morrison-Scott 1951, Lay 1967), was indicated to be a junior synonym of *P. pipistrellus* by Neuhauser & DeBlase (1971). These authors showed the name *aladdin* to be a prior name for assignation of the populations of Central Asia and of most of the Middle East, having a priority over the name *P. p. bactrianus* Satunin, 1905 (t.t.: Tedžen Oasis, Transcaspia [S Turkmenistan]). The latter name was broadly considered fitting to populations of *P. pipistrellus* of Central Asia and adjacent regions by most of the former reviewed authors (Satunin' 1914, Bobrinskoy 1925, Ognev 1927, 1928, Ogneff & Heptner 1928, Ryberg 1947, Kuzjakin 1950, 1965, Ellerman & Morrison-Scott 1951, Strelkov 1963, Meyer-Oehme 1965). However, the opinion presented by Neuhauser & DeBlase (1971) was not accepted by Strelkov et al. (1978), Strelkov (1981), and Butovskij et al. (1985), who considered *P. p. bactrianus* a valid subspecies in Central Asia and Kazakhstan, whereas Corbet (1978), DeBlase (1980) and Koopman (1994) regarded *bactrianus* to be a junior synonym of *aladdin*.

Neuhauser & DeBlase (1971: 275) summarised the main characters of *P. p. aladdin* (in its broader sense) differing from the nominotypical form and found the coloration traits only. The two subspecies are similar in size, dental characters and baculum shape. *P. p. aladdin* is described to be "a pale desert race characterised by a relatively broad white border on the wing membrane and uropatagium; dorsal pelage color light but variable at tips, basal halves blackish; ventral pelage similarly bicolored but lighter" which is in accordance with the previous descriptions of *P. p. bactrianus* (Satunin' 1905, 1914, Ognev 1927, Kuzjakin 1950, 1965, Strelkov 1963). They

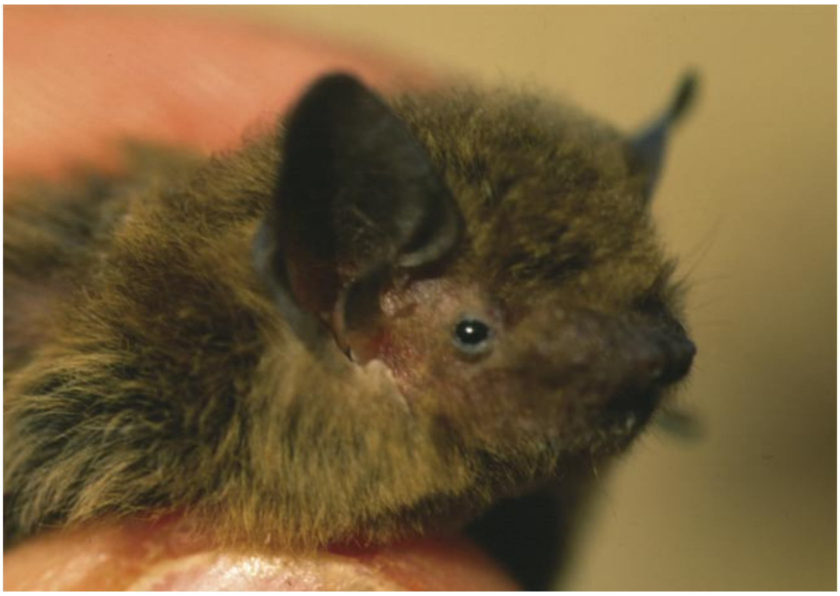


Fig. 119. Portrait of *Pipistrellus pipistrellus* (Schreber, 1774) from Sarghaya (photo by A. Reiter).

Table 28. Basic biometric data on examined Syrian and comparative samples of *Pipistrellus pipistrellus* (Schreber, 1774). For abbreviations see pp. 10, 11

			Syria					Middle East (other than Syria)		
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	15	**30.28**	28.9	31.8	0.809	25	**30.71**	29.0	33.9	1.076
LCr	14	**11.70**	11.37	12.15	0.204	24	**11.56**	10.93	12.16	0.307
LCb	14	**11.25**	10.79	11.53	0.193	24	**11.13**	10.42	11.68	0.340
LaZ	10	**7.41**	7.12	7.62	0.172	18	**7.37**	6.72	7.68	0.243
LaI	14	**3.16**	2.87	3.32	0.128	24	**3.22**	2.97	3.48	0.131
LaN	14	**6.04**	5.75	6.29	0.166	24	**6.07**	5.62	6.47	0.180
ANc	14	**4.23**	4.04	4.37	0.103	24	**4.19**	4.02	4.34	0.086
CC	14	**3.53**	3.36	3.77	0.103	23	**3.52**	3.25	3.88	0.164
M^3M^3	14	**4.82**	4.62	5.04	0.110	24	**4.86**	4.32	5.29	0.195
CM^3	14	**4.17**	4.03	4.37	0.108	23	**4.09**	3.78	4.47	0.154
LMd	14	**8.19**	7.90	8.42	0.157	23	**8.05**	7.59	8.58	0.253
ACo	14	**2.40**	2.23	2.67	0.112	23	**2.25**	1.97	2.48	0.127
CM_3	14	**4.40**	4.17	4.62	0.127	21	**4.34**	4.14	4.61	0.141

			Europe					Maghreb		
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	21	**31.57**	29.6	33.2	0.957	21	**28.95**	27.3	31.0	1.026
LCr	21	**12.10**	11.46	12.46	0.229	19	**11.45**	11.02	11.88	0.252
LCb	21	**11.54**	10.98	11.92	0.204	19	**10.94**	10.52	11.34	0.264
LaZ	15	**7.49**	7.25	7.78	0.148	15	**7.15**	6.89	7.38	0.154
LaI	21	**3.34**	3.06	3.57	0.111	19	**3.04**	2.76	3.22	0.133
LaN	21	**6.33**	6.01	6.61	0.174	19	**5.91**	5.68	6.15	0.136
ANc	21	**4.36**	4.08	4.55	0.119	19	**4.13**	4.02	4.41	0.094
CC	18	**3.59**	3.43	3.81	0.106	19	**3.38**	3.17	3.53	0.104
M^3M^3	19	**4.90**	4.68	5.09	0.124	19	**4.71**	4.50	4.93	0.115
CM^3	17	**4.24**	4.05	4.42	0.101	19	**4.01**	3.83	4.19	0.103
LMd	21	**8.34**	7.93	8.62	0.161	19	**7.93**	7.58	8.18	0.176
ACo	21	**2.38**	2.17	2.51	0.088	19	**2.23**	2.12	2.39	0.081
CM_3	21	**4.46**	4.33	4.59	0.064	19	**4.21**	3.97	4.35	0.113

considered *P. p. pipistrellus* a dark brown form, without any indication of a white border on the wing membranes and uropatagium. Based on these criteria, the Levantine populations of *P. pipistrellus* s. l. were assigned to the nominotypical subspecies by many authors (Lewis & Harrison 1962, Harrison 1964a, Kumerloeve 1975b, Atallah 1977, Corbet 1978, Qumsiyeh & Schlitter 1982, Harrison & Bates 1991, Koopman 1994, Mendelssohn & Yom-Tov 1999, Ferguson 2002), although the opinions concerning the populations of the more western and northern parts of the Near East are rather different (see von Lehmann 1966, Kumerloeve 1975a, Albayrak 1987, Steiner & Gaisler 1994, and the review by Benda & Horáček 1998).

Benda et al. (2003a) published the first records of *P. pipistrellus* in the Syria *proper*. They compared Syrian bats with those of Central Europe and showed slight differences between these samples in their wing size. The forearm length (LAt) of Syrian bats created a dimensional transition between European populations of the larger *P. pipistrellus* and smaller *P. pygmaeus*. However, in the ratio of the lengths of medial and distal phalanges of the third wing finger, a character clearly indicating *P. pipistrellus* in Central Europe (Häusler et al. 2000), the samples from Syria showed similar values as those from Europe. The slight metric difference in LAt as well as the genetic distance of 0.7–1.2% between Central European and Syrian samples were preliminarily interpreted to support a relatively separate position of the Levantine population of *P. pipistrellus*.

In a more representative genetic analysis, Hulva et al. (2004) found two subclades within the *P. pipistrellus* clade, the Eurasian one and the Maghrebian one. They reported a more or less gradual increase of the genetic distance depending on the geographical proximities between the respective Eurasian samples, i.e. the distance of 0.2–1.0% was detected between Syria and Iran, 0.2–0.7% between Syria and Cuacasus, 1.5–2.2% between Syria and eastern Kazakhstan, and 0.7–2.0% between Syria and Europe (incl. the Balkans and Iberia). However, they found genetic distance of 3–5% between Moroccan and Eurasian samples. These data show the Levantine populations of *P. pipistrellus* to be an inseparable part of the relatively uniform Eurasian group rather than a unique evolutionary unit that would deserve a peculiar taxonomic presentation.

The morphometric comparison of western Palaearctic populations of *P. pipistrellus* by Benda et al. (2004c) showed samples from the Middle East, incl. those from Syria, to possess a much broader variation range in skull dimensions than the samples from Europe (see also Table 28). The range found in the bats of the Middle East covers almost completely the ranges of European sets of two species samples, i.e. *P. pipistrellus* and *P. pygmaeus*, which seem to be mostly separated in skull dimensions. On the other hand, all compared samples concur in dental traits. The three analyses comprising also the Syrian samples (Benda et al. 2003a, 2004c, Hulva et al. 2004) indicate existence of the character displacement in pipistrelles in western Palaearctic: where two species live in sympatry (Europe), their size ranges are more narrow than in the region where only one

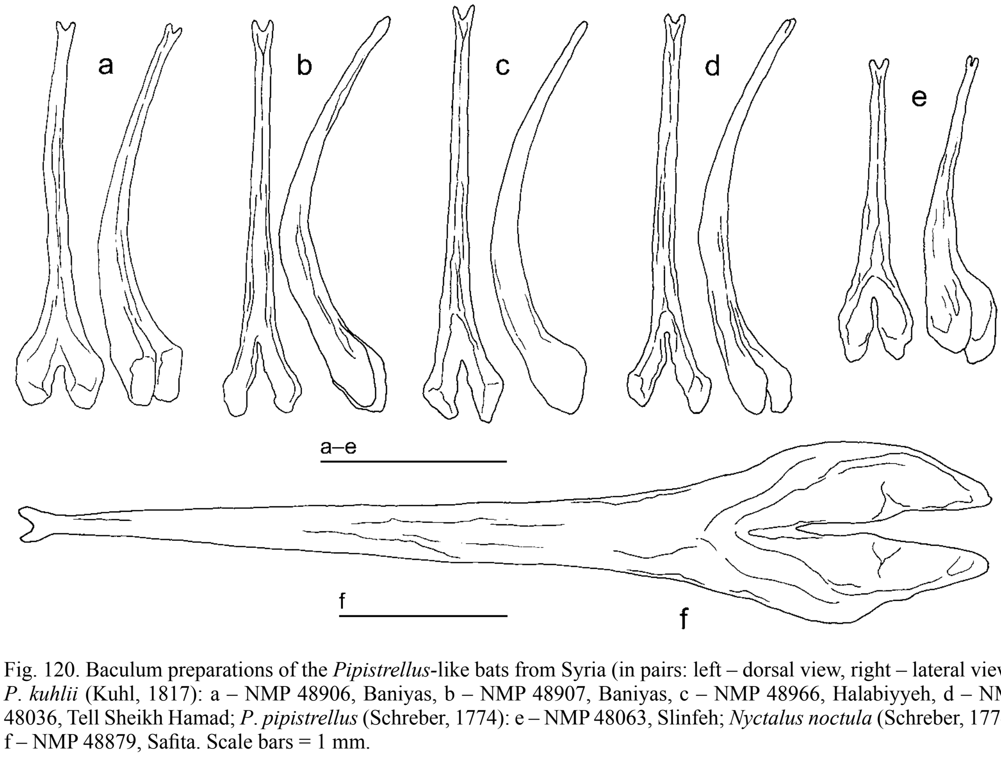


Fig. 120. Baculum preparations of the *Pipistrellus*-like bats from Syria (in pairs: left – dorsal view, right – lateral view). *P. kuhlii* (Kuhl, 1817): a – NMP 48906, Baniyas, b – NMP 48907, Baniyas, c – NMP 48966, Halabiyyeh, d – NMP 48036, Tell Sheikh Hamad; *P. pipistrellus* (Schreber, 1774): e – NMP 48063, Slinfeh; *Nyctalus noctula* (Schreber, 1774): f – NMP 48879, Safita. Scale bars = 1 mm.

species occurs (Middle East). Concurrently, these morphologically slightly distinct populations are genetically close.

The taxonomic assignation of the Syrian populations of *P. pipistrellus* according to the traditional measures (see above) seems to be undoubted; the Syrian samples correspond in coloration to the European ones and they should thus represent a nominotypical subspecies. We have not observed such degree of paling or even white margins of the wing membranes which is typical for the pale eastern form *aladdin* as well as for certain Mediterranean samples which have been generally considered to belong to the form *mediterraneus**. However, according to the genetic analysis carried out by Hulva et al. (2004), the differentiation of the Eurasian populations of *P. pipistrellus* into separate subspecies seems to be rather unjustified, as the colour differences observable among the particular samples could be caused by local climatic conditions.

Feeding ecology. *Pipistrellus pipistrellus* is a small-sized aerial hawker (Norberg & Rayner 1987). Previous studies from Europe indicated this species to hunt especially swarming insects above water surface or close to water bodies (mainly small Nematocera). The other important prey categories are Lepidoptera, Heteroptera and Hymenoptera (Swift et al. 1985, Hoare 1991, Sullivan et al. 1993, Beck 1995, Barlow 1997). In Azerbaijan, Rahmatulina (2005) found the diet of *P. pipistrellus* to be composed of Diptera, Coleoptera (mainly small Carabidae), Ephemeroptera, Plecoptera, Blattodea, and Hymenoptera (mainly Tenthredinidae).

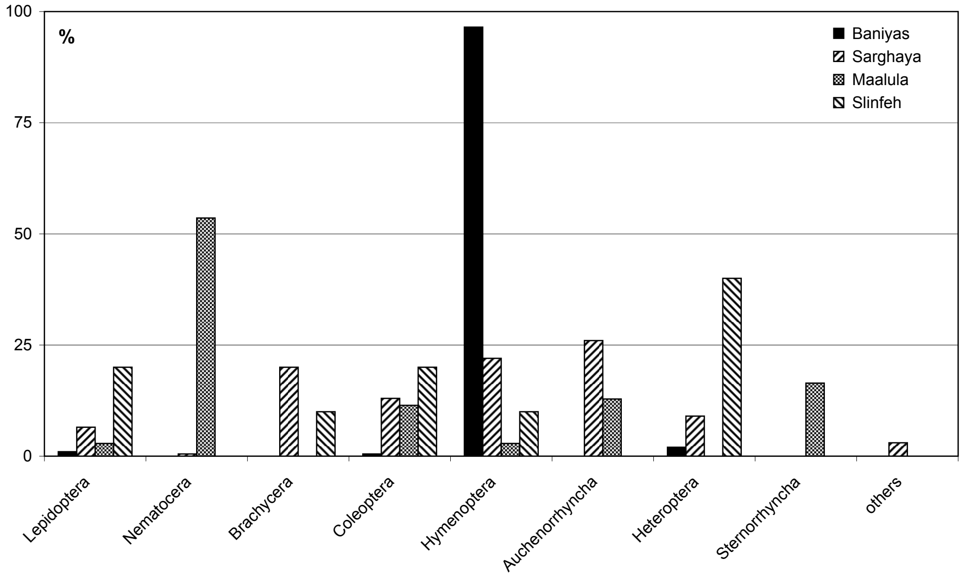


Fig. 121. Volume of particular food items in the diet of *Pipistrellus pipistrellus* (Schreber, 1774) from Syria.

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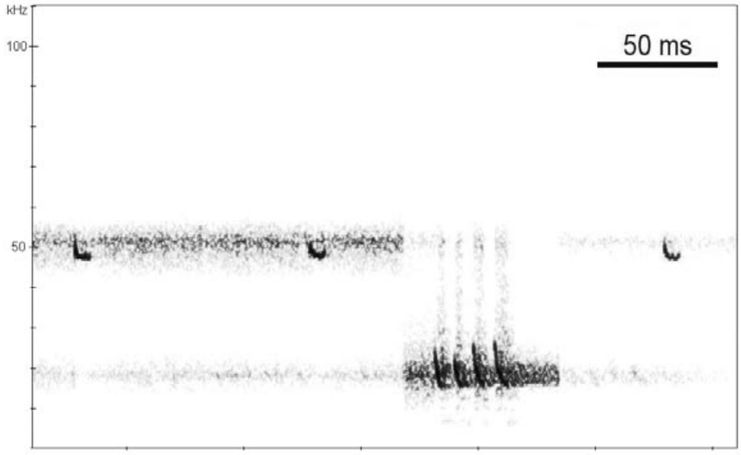
* Note. The name *Pipistrellus pipistrellus mediterraneus* Cabrera, 1904 (t.t.: 'Valencia, Alicante, Albacete?, Ciudad Real [Spain]' given by Cabrera 1904, restricted to 'Valencia, Spain' by Miller 1912) is presently considered to be a junior synonym of *Vespertilio pygmaeus* Leach, 1825 (ICZN 2003, Simmons 2005), however, it was suggested to designate this species instead (von Helversen et al. 2000, Van Cakenberghe 2001). Several authors assumed the form *mediterraneus* as a valid Mediterranean subspecies of *P. pipistrellus* s. l., which should be characterised by a partial pale margin of patagium (see e.g. Neuhauser & DeBlase 1971) and could occur also in the eastern Mediterranean or even more to the east (von Lehmann 1966, Gaisler 1970, Steiner & Gaisler 1994).

We analysed four samples of faeces (Fig. 121) and four digestive tracts of *P. pipistrellus* collected in the western part of Syria. Formicoidea, Nematocera, Heteroptera, Coleoptera, and Auchenorrhyncha were the most important food items. As far as the representation of Nematocera in the diet is concerned, we can point out that with the exception of one sample of faeces collected in Maalula (54% vol.) and one digestive tract collected in Ras al Bassit (30%), this prey category is nearly or completely absent from the diet of *P. pipistrellus* in Syria. This quite important difference between our results and results of previous studies in Europe is probably caused by the more extensive lack of water surfaces in Syria when compared with Europe. Nematocera are replaced with swarming ants (Hymenoptera: Formicoidea) and higher proportions of Heteroptera, Coleoptera and Auchenorrhyncha. The content of the remaining digestive tracts was similar to that of faeces samples collected at the same place.

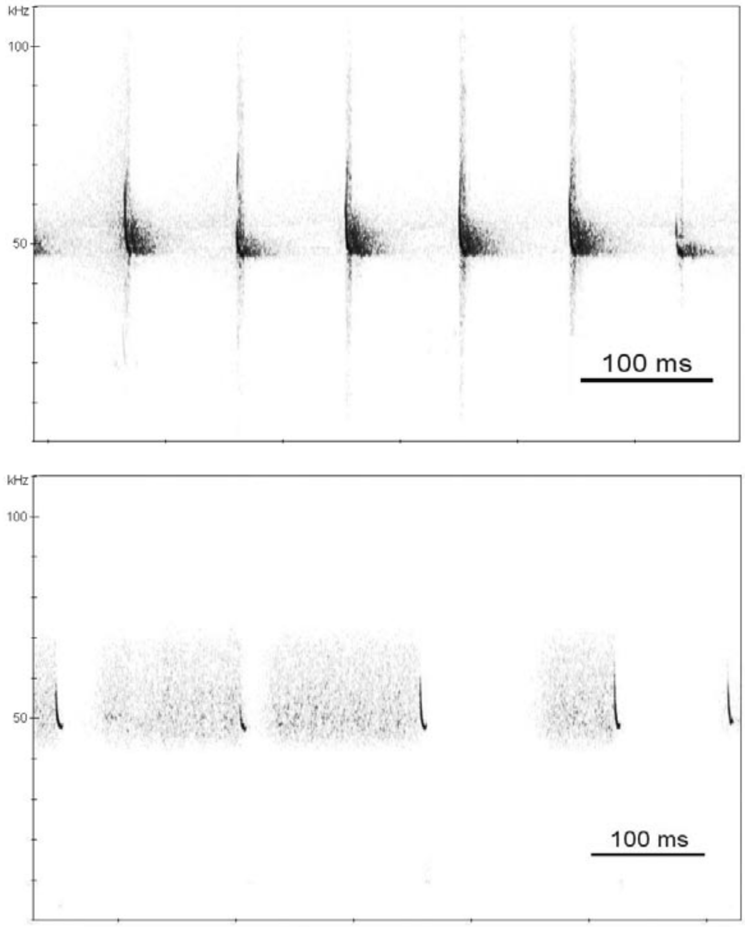
Our results indicate an important role of aerial hawking in the foraging behaviour of *P. pipistrellus* and certain regional variation in its diet.

Echolocation. Echolocation recordings of *Pipistrellus pipistrellus* were made at five sites in Syria (see the Records); Jabla (15 October 2004; Fig. 122), Maalula (3 October 2004; Fig. 123), Qala'at al Hosn (18 October 2004), Yabroud (5 October 2004; Fig. 124), and Ras al Bassit (11 October 2004). Typical advertisement calls of *P. pipistrellus* produced by males in flight were recorded at two sites (Jabla, Yabroud). Results of the analyses are given in Table 15. The species was observed foraging mostly around vertical objects such as riparian vegetation, rocks and buildings.

Echolocation calls in Syrian *P. pipistrellus* differ in some parameters from those described in European populations (e.g. Barratt et al. 1997, Russo & Jones 2002, Jahelková 2003, Obrist et al. 2004). Probably the most important differences were found in Fmax that was on average of about 3 kHz higher than in European populations. The upper values of the frequencies with maximum energy (Fmax) extended toward the lower margin of the range of a sibling species *P. pygmaeus* as described by e.g. the above mentioned authors. Since the species identification of *P. pipistrellus* in Syria was undoubtedly confirmed by genetic techniques (Benda et al. 2003a, Hulva et al. 2004) and moreover, found exclusive within the taxonomic complex in this country,



Figs. 122. Spectrogram of echolocation and social calls of *Pipistrellus pipistrellus* (Schreber, 1774): songflight of a male flying around a building in Jabla; advertising behaviour of *P. kuhlii* (Kuhl, 1817) was observed simultaneously at the same site.



Figs. 123, 124. Spectrograms of echolocation and social calls of *Pipistrellus pipistrellus* (Schreber, 1774). 123 (above) – an individual foraging around street lamps in Maalula. 124 (below) – an individual flying around rock cliffs above Yabroud (see Fig. 37).

the differences in echolocation parameters of Syrian bats seem to be real, rather than caused by a species misidentification. This statement also conforms with observations of typical advertisement calls of adult males at two sites, which were in accordance with those published for *Pipistrellus pipistrellus* from Europe (see e.g. Jahelková 2003).

Pipistrellus kuhlii (Kuhl, 1817)

Records. **Original data**: Al Lathiqiyeh: Ar Rawda near Rabi'ah [1], forest gorge, 4 May 2001: 3 inds. from *Strix aluco* pellets; – Jabla [2], city, 15 October 2004: det. several tens of inds.; – Jabla, coastal forest ca. 10 km to N of the city, 28 June 1998: det. min. 2 inds.; – Al Lathiqiyeh [4], 1910: 2 ma, 1 fa (specimens in MHNH); – Mashta Deir Mama [5], rocks, 1 June 2001: det. min. 5 inds. and 1 ind. from *Tyto alba* pellet; – Qala'at Salah ad Din [6], castle ruins, 13 October 2004: det. several tens of inds.; – Qala'at Salah ad Din, gorge under the castle [7], 14 October 2004: det. several tens of inds.; – Ras al Bassit [8], creek, 29 April 2001: net. 6 ma, 7 fa (coll. 1 ma); 3 June 2001: net. 1 ma; 11–13 October 2004: det. several tens of inds. – Deir ez Zur: Abu Kamal [9], above a pool in the Wadi ar Ratgah, 16 May 2001: net. 11 faL, 1 fs (coll. 5 fa); – Al Bas'ah [10], rocks above the Euphrates, 22 June 1998: 1 ind. from *Tyto alba* pellet; – As Salihiyyah [11], ruins of ancient Dura Europos, 18 June 1998: det. min. 2 inds.; 19 June 1998: 135 inds. from *Tyto alba* pellets; 19 April 2001: 1064 inds. from *Tyto alba* pellets; – As Salihiyyah, valley 2 km NW of Dura Europos [12], cave, 19 April 2001: det. min. 1 ind.; 59 inds. from *Tyto alba* pellets; – Ayyash [13], above a pool in a dry wadi of small tributary of the Euphrates, 19 May 2001: net. 5 ma, 12 faL, 1fs (coll. 3 ma, 3 fa); – Halabiyyeh [14], ruins of ancient fortress town, 7 October 1995: 1 ind. from *Tyto alba* pellets; 17 June 1998: net. 3 ma (coll. 2 ma); 17 June 1998: 127 inds. from *Tyto alba* pellets; 15 April 2001: 198 inds. from *Tyto alba* pellets; 15 April 2001: net. 6 ma; det. several inds.; 14 May 2001: obs. 1 ind. torpid in a fissure; – Mari [15], archeological excavation area, 18 June 1998: 3 inds. from *Athene noctua* pellets (cf. Obuch & Krištín 2004) and 6 inds. from *Tyto alba* pellets; April 2001: 7 inds. from *Tyto alba* pellets; – Marshadeh [16], rocks above the town, 20 April 2001: 6 inds. from *Tyto alba* pellets; – Qala'at ar Rahba [17], castle ruins, 18 and 21 April 2001: 29 inds. from *Tyto alba* pellets; 17 May 2001: coll. 1 ma; – Sbeikhan [18], small caves in an escarpment above the village, 15 May 2001: net. 3 ma, 1 fs; – Tell Sheikh Hamad [19], archeological excavation area, 20 June 1998: 1 ind. from *Athene noctua* pellet (cf. Obuch & Krištín 2004); 10 April 2001: 1 ind. from *Athene noctua* pellet; above the Al Khabour river, 19 June 1998: net. 2 ma, 1 faL, 1 fa, 1 fj; – Zalabiyyeh [20], rocks under ancient ruins, 15 April 2001: 150 inds. from *Tyto alba* pellets. – Der'a: Bosra [21], citadel ruins, 26 April 2001: 14 inds. from *Tyto alba* pellets; – Talsh'hab [22], waterfall in the Al Yarmuk Valley, 25 May 2001: net. 1 faG, 2 faL. – Dimashq: Al Tawani [23], 5 km S of Jaba Deen, streamlet in valley, 21 May 2001: net. 2 ma, 6 faL (coll. 2 ma, 3 fa); – Dimashq [24], city, 31 October 2004: det. several tens of inds.; – Harasta [25], 5 July 1989: coll. 1 m; – Yabroud [26], above a rocky wall, 5 October 2004: det. min. 1 ind. – Halab: Halab [27], city centre, 10 October 2004: repeatedly det. several inds.; – Qala'at Najm [28], castle ruins, 10 May 2001: obs. 3 inds. (coll. 1 ma); – Qatura [29], necropolis, 2 June 2001: net. 2 ma, 1 faG. – Hama: Hama [30], building of the municipal museum, 2 July 1997: obs. nurs. colony of ca. 50 inds. (coll. 1 ma, 2 mj); – Qala'at al Mudiq [31], ruins of ancient Apamea, 1 May 2001: det. several inds.; – Qala'at Sheisar [32], castle ruins, 1 July 2001: 3 inds. from *Tyto alba* pellets; – Qantara [33], Orontes River 2 km to S, 30 May 2001: net. 3 faL; – Qasr Ibn Wardan [34], ruins of Byzantine manor, 31 May 2001: 2 inds. were found in ceiling fissures (coll. 1 ma). – Hassake: 'Ain Diwar [35], above a creek ca. 5 km to SW, 18 May 2001: net. 1 fa, 1 faL; – Hassake [36], park on the town edge, 20 June 1998: 1 ind. from *Asio otus* pellet and 1 ind. from *Tyto alba* pellet; – Khazneh [37], Jebel 'Abd al 'Aziz, cave, 17 May 2001: net. 2 ma; – Najmouk [38], a field 2 km to SW, 20 June 1998: det. min. 3 inds.; – Qala'at Sukkara [39], Jebel 'Abd al 'Aziz, ruins, 2 October 1988: net. 1 f. – Homs: Qala'at al Hosn [40], ruins of Krak des Chevaliers, under castle bridge, 10 May 2001: net. 3 ma, 25 fa; 18 October 2004: net. 9 ma, 12 ms, 11 fa, 5 fs. – Qattinah [41], under dam of the Lake Homs, 27 June 1998: det. min. 10 inds.; 8 May 2001: det. min. 10 inds.; – Tadmor [42], "Palmyra Dam", 20 May 2001: net. 2 ma, 1 fa, 3 faL; Tadmor, palmeria, 23 April 2001: 1 ind. from *Asio otus* pellet; 15 September 2005: 5 inds. from *Asio otus* pellets; Tadmor, city, 3 May 2001: det. and obs. several tens of individuals; Tadmor, palmeria, above a garden pool, 7 October 2004: net. 18 ma, 7 ms, 1 fa, 2 fs, det. hundreds of inds.; – Idlib: Babl'hawa [43], border crossing point, 15 June 1998: det. min. 3 inds. – Raqqa: Lake Assad, SE bank between Mishirfeh and Ath-Thaura [44], 15 June 1998: det. min. 3 inds.; – Kisret Mhamadali [45], rocky cliff, 28 June 1998: 83 inds. from *Tyto alba* pellets; – Qala'at Ja'Abar [46], castle ruins, 12 May 2001: obs. 6 inds. (coll. 3 ma); – Qala'at Ja'Abar, camp area ca. 1 km NW of the ruins [47], 12 May 2001: det. min. 2 inds.; – Raqqa [48], 8–9th century Islamic settlement at mouth of the Al' Balikh river into the Euphrates, maxillary fragment; – Rasafah [49], ancient ruins, 16 June 1998: obs. several solitary resting inds., ca. 70 inds. net. at cisterns (coll. 6 ma, 5 mj, 1 faL, 1 fj); 16 June 1998: 9 inds. from fresh *Tyto alba* pellets, 14 inds. from old *Tyto alba* pellets in a cistern; 27 June 1998: 4 inds. from *Tyto alba* pellets; 13 April 2001: net. 10 ma, 2 fs; 14 April 2001: 22 inds. from *Tyto alba* pellets, 25 inds. from old *Tyto alba* pellets in a cistern, and 1 ind. from *Athene noctua* pellet (cf. Obuch & Krištín 2004); 13 May 2001: net. ca. 40 inds. (coll. 5 ma, 1 fa, 2 faL, 1 faG); 8 October 2004: net. 64 ma, 5 ms, 9 fa, 7 fs (coll. 1 ind.). – Suweida: Sia [50], 'Suweida Dam', 25 May 2001: det. min. 3 inds. – Tartus: 5 km W of Qala'at al Hosn [51], 13 May 2001: net. 1 ma; – Baniyas [52], above a creek, 31 May 2001: net. 4 ma, 9 faG, 1 faL (coll. 3 ma, 3 fa); 17 October 2004: net. 8 ma, 2 ms, 5 fa, 4 fj; – Qala'at al Marqab [53], castle ruins, 16 October 2004: det. several tens of inds. – Safita [54], above a river ca. 5 km to SE, 29 May 2001: net. 2 ma, 2 faL. – Quneitra/Golan Heights: Camp Faouar [55], 1980: 2 ma, 3 inds. ad. (specimens in NMW); – Khad Nes [56], above the Jordan River, 18 July 1999: det. min. 10 inds.; – Kursi [57], shore of the Lake Tiberias (Sea of Galilee), 19 July 1999: det. min. 2 inds.; – Ya'ar Oden forest [58], 17 July 1999: det. min. 3. inds. – **Published data**: Deir ez Zur: Dura Europos (= As Salihiyyah) [11], 17 May 1989: 11 inds. from *Tyto alba* pellets (Shehab et al. 2004); – Mejadin am Euphrat (= Mayadin) [59], 2 April 1910: 13 ma, 12 fa (von Wettstein 1913); – Qala'at ar Rahba [17], 14 March 1979: 2 ad. inds. from owl pellets (Nader & Kock 1983c). – Dimashq: Djéroud (= Jeiroud) [60], NE de Damas (= Dimashq), April–June 1908: 3 inds. (Trouessart & Kollmann 1923); – Damascus (= Dimashq) [24], Kanawat Station, 1 f (Harrison 1964a). – Hama: Apamea (Kalaa El-Moudik) (= Qala'at al Mudiq) [31], 25 March 1980: 1 ma (Nader & Kock 1983c). – Raqqa: As Sabkhah (= As'sabkha) [61], 28 February 1993: 1 m (Ebenau 1993); – Casret-Mohammed-Ali (= Kisret Mhamadali) [45], 19 March 1996: 5 inds. from *Tyto alba* pellets (Ebenau 1996); Qasret Mohammed Ali (= Kisret Mhamadali), 28 June 1998 [not specified] (Shehab et al. 2004); – Cater (= Qatr) Magara cave [62], 1994: net. 8 inds. (Ebenau 1994, 1996); Qater Maghara (= Qatr Magara), 19 March 1996: 1 ind. from owl pellets (Shehab et al. 2004); – the desert 5 km S of the Euphrates Valley (= Raqqa, 12 km to SW, "Eulenschacht" cave) [63], 18 March 1996: 16 inds. from *Tyto alba* pellets (Shehab et al. 2004); – Okersheih (= Ikersheh) [64], 20 March 1996: 4 inds. from *Tyto alba* pellets (Shehab et al. 2004); – Rasafah [49], 28 March 1996: 1 ind. from *Tyto alba* pellets (Shehab et al. 2004). – Rakka (= Raqqa) [65], 28 June 1910: 2 m, 11 f (von Wettstein 1913). – Quneitra/Golan Heights: Golan, four or five unidentified records mapped in northern and central parts of this region [roughly the areas of Mas'adah, Baniyas, Ortal, Katsrin and Ramot], 19–20 June 1995, several specimens; Mount Hermon, 20 June 1995: 2 faL (Mendelssohn & Yom-Tov 1999).

Possible records (Syria *sensu lato*). **Published data**: Syrien (Kolenati 1856b). – Syria (Trouessart 1879). – Syrie, 1878: 6 inds. ad. (Jentink 1888). – Siria, 2 inds. (Cabrera 1912).

Distribution. **General**. *Pipistrellus kuhlii* is a species with mostly Mediterranean type of distribution (Corbet 1978, Horáček et al. 2000, Kock 2001b, Bogdanowicz 2004), although it reaches also the Oriental Region (Horáček et al. 2000, Bates & Harrison 1997) and possibly marginally the Afro-tropical Region (see Kock 2001b). It is distributed in a circum-Mediterranean area; in Africa it occurs in the Canary Islands and in the belt of northern Sahara and the supra-Saharan Mediterranean from Morocco to Egypt; in entire southern Europe with reaches to northwestern France and southern England, and to Germany, Austria, Slovakia, and Hungary; in eastern Europe it ranges from the Black and Caspian Sea and the Caucasus Region to central Ukraine; most of the Mediterranean islands, the Middle East to Pakistan and southern regions of Central Asia; isolated records are known from eastern India (Koopman 1994, Bates & Harrison 1997, Horáček et al. 2000, Benda et al. 2004d, Bogdanowicz 2004, Ceľuch & Ševčík 2006, Sachanowicz et al. 2006, etc.).

Near East. *P. kuhlii* inhabits the whole area of the Near East, it is very probably the most abundant bat species there (Sanborn 1940, Harrison 1956b, Lewis & Harrison 1962) and is the most widespread, apparently across most of ecological borders (DeBlase 1980, Harrison & Bates 1991, Benda & Horáček 1998, Mendelssohn & Yom-Tov 1999).

Although *P. kuhlii* occurs in all biogeographic regions of Turkey (Danford & Alston 1880, Satunin 1913, Osborn 1963, Çağlar 1965, 1969, von Lehmann 1966, 1969, Kock et al. 1972, DeBlase & Martin 1973, Nader & Kock 1983c, Albayrak 1990a, 1993a, 2003, Nadachowski et al. 1990, Aktaş & Hasbenli 1994, Benda & Horáček 1998, Karataş et al. 2004), most of the findings have been made in Cilicia, Hatay and Turkish Mesopotamia – two thirds of its Turkish records come from this limited area (Aktaş & Hasbenli 1994, Benda & Horáček 1998, Karataş et al. 2004).

According to Lewis & Harrison (1962), *P. kuhlii* is the most common bat in Lebanon; its sites are scattered throughout the country (Allen 1915, Lewis & Harrison 1962, Harrison 1964a, Atallah 1977, Tohmé & Tohmé 1985, Ibáñez & Fernández 1989). Many authors consider *P. kuhlii* the commonest insectivorous bat in Palestine which has been found throughout the northern part of the country as south as the central Negev Desert, the Judean Desert and the Dead Sea Basin (Tristram 1866, 1884, Aharoni 1930, Dor 1947, Theodor & Moscona 1954, Bodenheimer 1958, Harrison 1964a, Atallah 1977, Qumsiyeh 1985, 1996, Makin 1977, 1987, Harrison & Bates 1991, Yom-Tov et al. 1992a, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Ferguson 2002, Korine & Pinshow 2004). In Jordan, *P. kuhlii* has been recorded in the areas adjacent to the Rift Valley as well as in oases of the Syrian Desert in the eastern part of the country (Atallah 1967, Qumsiyeh et al. 1992, 1998, Qumsiyeh 1996, Darweesh et al. 1997, Amr et al. 2004).

P. kuhlii is widespread in Mesopotamia where the records come mainly from the surroudings of big rivers but also from desert oases throughout Iraq (von Wettstein 1913, Cabrera 1912, Cheesman 1920, Sanborn 1940, Weber 1955, Harrison 1956b, 1964a, Hatt 1959, Lewis & Harrison 1962, Nader 1969, Kock et al. 1972, Shamsuddin & Mohammad 1978, Al-Shenawi et al. 1982, Nader

& Kock 1983c, Khajuria 1988, Abul-Hab & Shihab 1989, Nadachowski et al. 1990, Harrison & Bates 1991). In Iran, this bat occurs both in Mesopotamian semi-deserts and in mountainous regions of the Zagros Range (Dobson 1871, Thomas 1905, 1907, Cheesman 1920, 1921, Lay 1967, Etemad 1969, DeBlase 1980, Sharifi et al. 2004, our unpubl. data); this species is the most widely ranging as well as most common bat in southwestern Iran (DeBlase 1980). According to the available data, *P. kuhlii* is the most common insectivorous bat in Cyprus (Günther 1879, Bate 1903, Theodor 1954a, 1956, Theodor & Moscona 1954, Kock 1974, Spitzenberger 1979, Boye et al. 1990, our unpubl. data, etc.).

Syria (Fig. 125). *P. kuhlii* is a common bat in Syria, at least 69 records are available from the country (Table 1). It is the most frequently found bat, the total number of its records is almost three times higher than that of the second most common bat, *R. ferrumequinum* and more than four times than those of the third-fourth ones, *P. pipistrellus* and *T. teniotis*.

P. kuhlii occurs throughout Syria, it was found it in all regions where bat research was carried out. *P. kuhlii* is the most common bat both in the Mediterranean areas of the western part of the country as well as in the steppes and semi-deserts of its eastern part. It is the only bat species documented from the northeastern corner of Syria [35, 38]. Along the Euphrates, no site without *P. kuhlii* has been found among those where the bats were looked for. According to the known distribution in the surrounding countries (see above), the Syrian territory lies in the centre of ecological optimum of *P. kuhlii* in the Near East. This optimum is probably created by a transition between

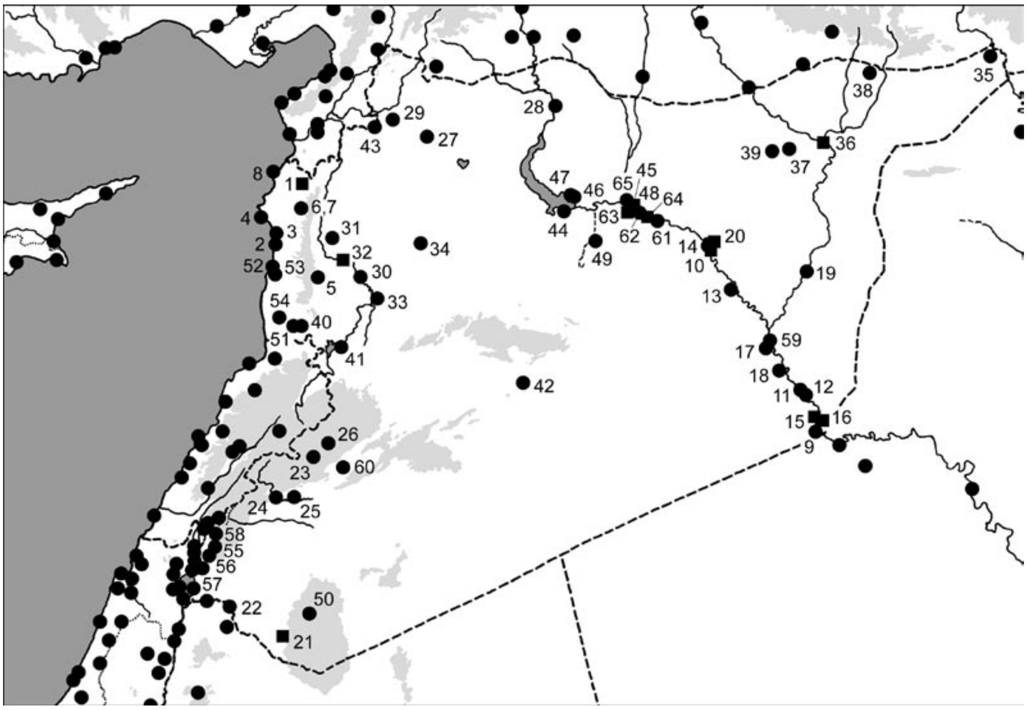


Fig. 125. Records of *Pipistrellus kuhlii* (Kuhl, 1817) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

three habitat types: the Mediterranean shrubland, continental steppes and continental deserts; it fades in mountains of central Anatolia in the north and in true deserts of southern Palestine and central Arabia in the south (see Benda & Horáček 1998, Mendelssohn & Yom-Tov 1999).

P. kuhlii is the first bat species whose occurrence in Syria was published (Kolenati 1856b). However, this record actually should come from the present-day Lebanon, according to the later quoting by Kolenati (1860) and Fitzinger (1870c): 'am Libanon in Syrien' and 'in Syrien am Libanon', respectively.

FIELD NOTES. Roosts of *Pipistrellus kuhlii* were found most frequently in ruins and deserted buildings in the eastern, arid part of Syria. The only exception was the finding of a colony of ca. 50 individuals roosting in a fissure between the wall and wooden ceiling of an empty room at the first floor of the municipal museum in Hama (Figs. 126, 127), i.e. in the western, Mediterranean region of the country. Other records are findings of single individuals in fissures between stones in stone buildings or ruins. At Rasafah, large numbers of solitary bats were detected in the western wall and one individual in the eastern wall on 16 June 1998, four solitary males were discovered in the western wall on 13 May 2001. In various parts of the ruined castle of Qala'at Najm, three individuals were found in crevices between stones of the ceiling vault. A similar situation was found in the ruins of Qala'at Ja'Abar, where six bats were hidden in such crevices. In a tower in the western wall in the ruined city of Halabiyyeh, one individual was discovered in a fissure between stones of a wall. A solitary male was collected from a crevice of the ceiling vault in a basement room of Qala'at ar Rahba. In the ruined desert manor of Qasr Ibn Wardan, two solitaries were found in fissures between stone blocks. Harrison (1964a), Al-Robaae (1966), Qumsiyeh (1996) reported similar roost types of this species from other parts of the Middle East.

P. kuhlii was recorded at many sites by netting; in most cases the nets were installed above water bodies and only a smaller part of the netting sites were at openings of underground spaces. Over 70 individuals were caught at openings of cisterns in the centre of the ruins of Rasafah on 16 June 1998, about 40 bats at the same place on 13 May 2001, at least 12 individuals on 13 April 2001, and around 85 bats on 8 October 2004 (Figs. 94, 95). Inside the ruined city of Halabiyyeh, three males were netted on 17 June 1998 and six males on 15 April 2001. Four bats were caught in two nets installed at the entrances of small caves in cliffs above the Euphrates valley at Sbeikhan. Two males were captured at the entrances of two small caves on a hill above the village of Khazneh. Under a bridge span at Krak des Chevaliers (Qala'at al Hosn) 37 bats were netted.

Above the Al Khabour river at Tell Sheikh Hamad, eight individuals were caught. 12 females were netted above a pool in a sand pit in the Wadi ar Ratgah at Abu Kamal (Fig. 79). Under a road bridge above a creek ca. 5 km southwest of 'Ain Diwar, two females were captured. Over a small pool of rest water in the wadi of a small tributary of the Euphrates at Ayyash, 18 bats were netted. At Tadmor, six individuals were caught above the shore of the large reservoir 'Palmyra Dam' on 20 May 2001 and 28 bats were captured above a swimming pool in a garden of the oasis on 7 October 2004. Above a small reservoir on a creek below the village of Al Tawani in the Anti--Lebanon Mts, eight individuals were captured. Three females were netted above a small lake below the waterfall in the Al Yarmuk Valley at Talsh'hab (Fig. 8). Three bats were caught above a river ca. 5 km southeast of Safita. Above the Orontes river, ca. 2 km south of Qantara (Fig. 128), three females were captured. This species was twice netted above a small reservoir on a creek at Baniyas; 14 individuals were caught on 31 May 2001 and 19 bats on 17 October 2004. One male was netted above a water channel at the southern edge of the village of Ras al Bassit and three individuals were caught above a temporary water pit at the Qatura necropolis (Fig. 113).

Since *P. kuhlii* is the most widespread species in Syria (see Distribution) and its occurrence covers completely the area of the country, the associated bat species are almost all members of the fauna. In the shelters, mostly the desert dwelling species were recorded, however, they were found to roost in different crevices and/or spaces of the respective ruin complexes; *T. nudiventris*, *E. bottae* and *O. hemprichii* in Rasafah; *R. ferrumequinum* in Qala'at Najm; *T. nudiventris* and *A. tridens* in Halabiyyeh; and *T. nudiventris*, *A. tridens* and *O. hemprichii* in Qala'at ar Rahba. During netting sessions, all species types were associated to *P. kuhlii* catches; *E. bottae* and *O. hemprichii* in Rasafah; *M. capaccinii* at Abu Kamal; *T. nudiventris*, *E. bottae* and *O. hemprichii* at Khazneh; *T. nudiventris* and *O. hemprichii* at Ayyash; *R. aegyptiacus*, *M. nattereri* and *M. schreibersii* at Talsh'hab; *E. serotinus*, *N. noctula* and *M. schreibersii* at Safita; *E. anatolicus* and *P. pipistrellus* at Baniyas; *R. ferrumequinum* and *H. savii* at Qatura; *R. aegyptiacus* and *R. ferrumequinum* at Qala'at al Hosn; and *E. serotinus*, *E. bottae* and *M. schreibersii* at the Taubenbrunnen cave (Ebenau 1994, 1996).

The reproduction phases of *P. kuhlii* in Syria seem to be extended over considerably long periods of the spring/early summer season. Out of a dozen bats netted at Abu Kamal on 16 May

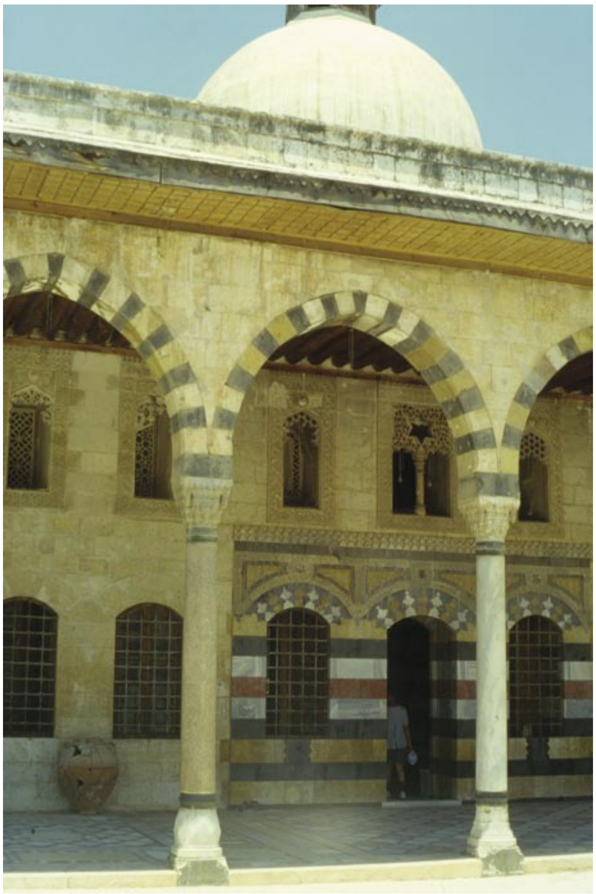


Fig. 126. Hama, municipal museum, roost of a colony of *Pipistrellus kuhlii*: atrium at the first floor of the museum; in the empty room with open door, a roosting colony of ca. 50 individuals was found (note the uncovered window above the door – the access route of the colony) (photo by P. Benda).

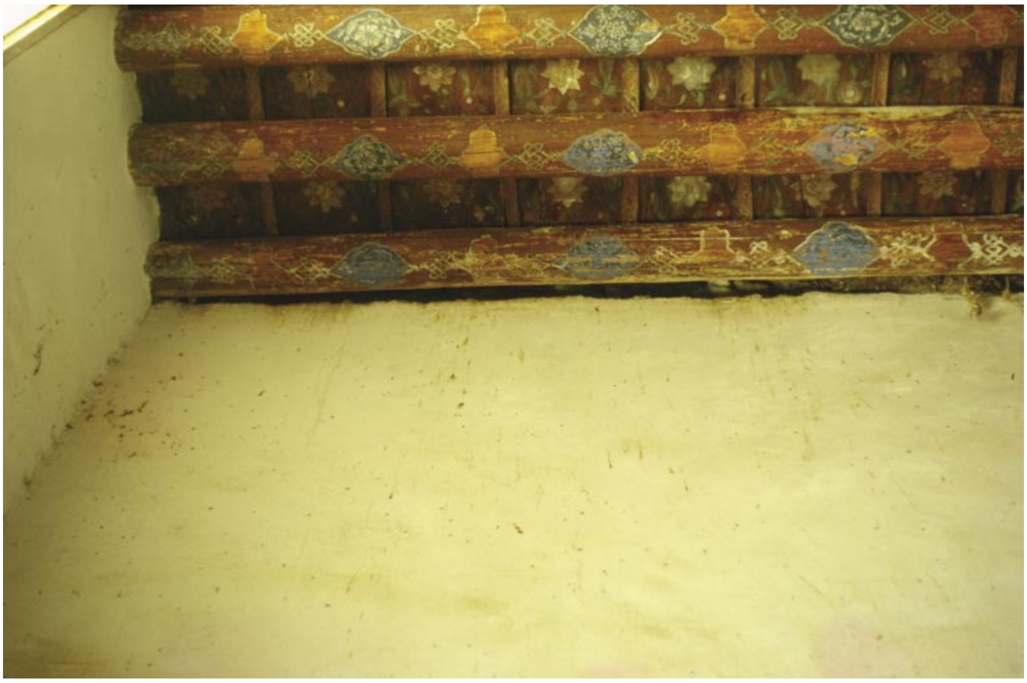


Fig. 126. Hama, municipal museum, roost of a colony of *Pipistrellus kuhlii*: fissure between the side wall and ceiling timber of the room in which the colony of *P. kuhlii* was roosted (photo by P. Benda).

2001, 11 were lactating females. Females in lactation were caught also at 'Ain Diwar on 18 May 2001 (one of two bats), at Ayyash on 19 May 2001 (12 of 18 inds.), at Tadmor on 20 May 2001 (three of six bats), at Al Tawani on 21 May 2001 (six of eight bats). However, out of three females netted at Talsh'hab on 25 May 2001, two were in lactation and one pregnant with two foeti of the crown-rump length of 16.3 mm. The only female caught at Safita on 29 May 2001 was newly post-partum. At Qantara, there were three lactating females netted on 30 May 2001. Out of 14 individuals caught at Baniyas on 31 May 2001, one was a lactating female and nine were pregnant females; each of them contained two foeti of the length varying between 14 and 18 mm (mean 16.3 mm; three females examined). At Qatura on 2 June 2001, we netted two lactating females and a pregnant one, with two foeti of the length of 16 mm. Among the number of bats netted in Rasafah on 16 June 1998, also full-grown volant juveniles were recorded; their LAt varied from 33.0 to 35.6 mm (mean 34.08 mm; n=6), i.e. they correspond with the adult dimensions. One lactating female was caught at Tell Sheikh Hamad on 19 June 1998. Two male juveniles from the colony discovered in Hama on 2 July 1997 were examined; they were volant but not full-grown, with LAt of 27.8 and 29.7 mm.

In conclusion, we observed lactating females over a month from mid-May to mid-June, but at the same time also pregnant females occurred in late May and early June. However, distribution of the data suggests that the births occur earlier in the continental desert part of the country, where the spring vegetation season is presumably shorter than in the Mediterranean part, where the mesic climate enables later and longer period of reproduction. While in the east we met only lactating females in May, we found also pregnant bats at the end of May and in early June in the west.

Weber (1955) reported a finding of a half-grown juvenile at Baghdad, Iraq on 17 May. Lewis & Harrison (1962) found in Lebanon a female behaving to be pregnant in mid-February, and estimated timing of births in late April and May. Harrison (1964a) found a parturient female in northern Palestine on 10 June, he gave also the dimensions of newborns: crown-rump lengths 20.2 and 21.8 mm. From Iraq, Al-Robaae (1966) reported females in high pregnancy from mid-March. DeBlase (1980) reviewed findings of barely volant individuals from Iran made on 5 and 15 May, and on 21 June. Nader & Kock (1983c) found two pregnant females containing two embryos at al Hamza (Iraq) on 4 May. Qumsiyeh (1996) observed lactating females in the Holy Land on 24 June. Harrison & Bates (1991) estimated the birth period to occur in late April till May. Barak & Yom-Tov (1991) found pregnant females in northern Palestine from March to May, lactating females from May to July, and flying youngs they observed from June onwards. All these data correspond with our findings and/or conclusions.

In Syria, remnants of *P. kuhlii* were found in the diet of *Tyto alba* (Shehab et al. 2004, our data), *Athene noctua* (Obuch & Krištín 2004), *Asio otus*, and *Strix aluco* (our data). The species was identified in 40 samples coming from 23 sites; 27 of the samples of them were analysed completely (Table 35). *P. kuhlii* is a bat found most frequently and in highest absolute and relative numbers in owl diet in Syria and obviously represents an important prey at least for *T. alba* in the arid parts of the country. Its remains represented 0.13–32.13% (mean 7.06%) per sample volume of all prey items of *T. alba* diet (and 0.18–38.89% [mean 8.41%] of mammalian and

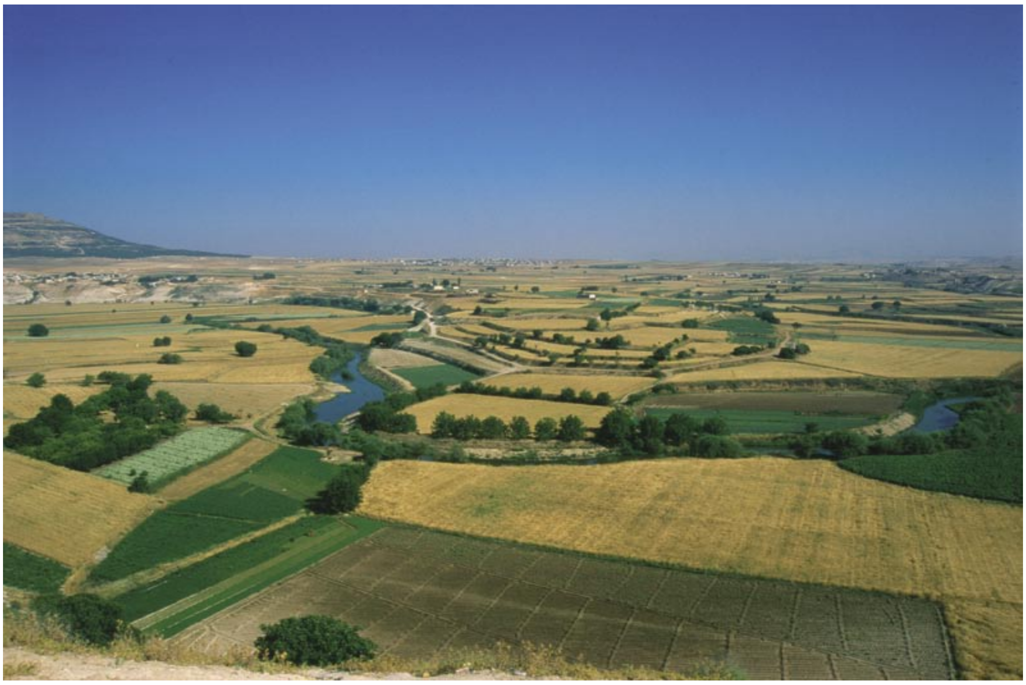


Fig. 128. Fertile lowland of the Orontes river at Qantara. Netting site of *Pipistrellus kuhlii* (photo by A. Reiter).

Fig. 129. Jordan river at Khad Nes where numerous foraging individuals of *Pipistrellus kuhlii* were detected. The Jordan river creates here a political border between Syria and Palestine (photo by P. Benda).

56.82–100% [87.48%] of bat items); 0.18–3.53% (mean 1.21%) per sample volume of all prey items of *A. noctua* diet (and 4.35–33.33% [mean 16.94%] of mammalian and 100% of bat items); 0.35–4.17% (mean 2.02%) per sample volume of all prey items of *A. otus* diet (and 0.61–14.29% [mean 5.97%] of mammalian and 16.67–100% [52.78%] of bat items); 2.08% of all prey items in the respective sample of *S. aluco* diet (and 3.61% of mammalian and 100% of bat items) from Syria, respectively. In the Middle East, remains of *P. kuhlii* were found also in the diet of *T. alba* and *A. otus* from Palestine (Dor 1947, Obuch unpubl.), *S. aluco* in Turkey (Benda & Horáček 1998), *T. alba* in Iraq (Nader 1969), and of *A. noctua* and *T. alba* from Iran (Obuch & Krištín 2004, Obuch unpubl.).

Material examined. 5 fa (NMP 48808, 48810, 48811 [S+A], 48809 [S+B], 48807 [A]), Abu Kamal, 16 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 fa (NMP 48824, 48825 [S+A]), 'Ain Diwar, 18 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ind. (rostrum, right mandible, from owl pellet), Al Bas'ah, 22 June 1998, leg. J. Obuch; – 2 ma, 3 fa (NMP 48844–48847 [S+A], 48848 [A]), Al Tawani, 21 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 11 inds. (SMF 80623; 11 rostra, 9 left and 5 right mandibles, from owl pellets), As Salihiyyah, 17 May 1989, leg. D. Kock; – 135 inds. (NMP 90389; 22 skulls, 71 rostra, 5 rostral fragments, 135 right mandibles, 133 left mandibles, from owl pellets), As Salihiyyah, 19 June 1998, leg. J. Obuch; – 3 ma, 3 faG (NMP 48831, 48832, 48834–48836 [S+A], 48833 [A]), Ayyash, 19 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 3 ma, 3 fa (NMP 48903–48906, 48908 [S+A], 48907 [S+B]), Baniyas, 31 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma, 1 m, 3 inds. ad. (NMW AB90/512, AB90/514, KK 19, AM 81/99, AM 81/100 [S+B]), Camp Faouar, 1980, leg. K. Kollnberger; – 2 fa (MNHN 1983-1500 [S+A], 1983-1501 [A]), Djéroud (= Jeiroud), 1908, leg. H. Gadeau de Kerville; – 2 ma (NMP 48028, 48029 [S+A]), Halabiyyeh, 17 June 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 6 ma (NMP 48966–48968 [S+A], 48969–48971 [A]), Halabiyyeh, 15 April 2001, leg. P. Munclinger & P.

Nová; – 127 inds. (NMP 90377; 27 skulls, 55 rostra, 32 right maxillae, 23 left maxillae, 127 left mandibles, 122 right madibles, from owl pellets), Halabiyyeh, 17 June 1998, leg. J. Obuch; – 1 ind. (NMP 90378; rostrum and right mandible, from owl pellet), Al Bas'ah, 22 June 1998, leg. J. Obuch; – 1 ma (NMP 47962 [S+A]), 2 mj (NMP 47963, 47964 [A]), Hama, 2 July 1997, leg. P. Benda; – 1 m (SMF 78529 [A]), Harasta, 5 July 1989, leg. H. Tayeb; – 1 ind. (NMP 90379; skull and both mandibles, from owl pellet), Hassake, 20 June 1998, leg. J. Obuch; – 4 inds. (SMF 84445–84448, from owl pellets), Ikershesh, 20 March 1996, leg. C. Ebenau; – 2 ma (NMP 48820, 48821 [S+A]), Khazneh, Jebel 'Abd al 'Aziz, 17 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ind. (SMF 84481, from owl pellets), Kisret Mhamadali, 19 March 1996, leg. C. Ebenau; – 83 inds. (ISEA M/11767–11770, M/11783–11788, M/11792–11806, M/11808; 36 skulls, 44 rostra, 3 right maxillae, 2 left maxillae, 47 left mandibles, 55 right mandibles, from owl pellets), Kisret Mhamadali, 28 June 1998, leg. A. Shehab; – 2 ma, 1 fa (MNHN 1985-1915–1917 [A]), Lattakié (= Al Lathiqiyeh), 1910, leg. H. Gadeau de Kerville; – 12 ma, 13 fa (NMW 26316–26340 [S+A]), Majadin (= Mayadin), 2 April 1910, leg. V. Pietschmann, Mesopotamien-Expedition 1910; – 9 inds. (NMP 90380, 90381; 3 right maxillae, 9 left mandibles, 6 right mandibles, from owl pellets), Mari, 18 June 1998, leg. J. Obuch; – 1 ma (NMP 49988 [S+A]), Qala'at al Hosn, 10 May 2001, leg. R. Lučan; – 1 ma (SMF 60364 [S+A]), Qala'at al Mudiq, Apamea, 25 March 1980, leg. R. Kinzelbach; – 2 inds. (SMF 60362, 60363, from owl pellets), Qala'at ar Rahba, 14 March 1979, leg. R. Kinzelbach; – 29 inds. (NMP 90382; 17 rostra, 7 right maxillae, 7 left maxillae, 29 left mandibles, 25 right mandibles, from owl pellets), Qala'at ar Rahba, 18 and 21 April 2001, leg. J. Obuch; – 1 ma (NMP 48814 [S+A]), Qala'at ar Rahba, 17 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 3 ma (NMP 48767–48769 [S+A]), Qala'at Ja'Abar, 12 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma (NMP 48758 [S+A]), Qala'at Najm, 10 May 2001, leg. P. Benda, A. Reiter & D. Weinfurtová; – 3 inds. (NMP 90383; 1 rostrum, 3 right mandibles, 1 left mandible, from owl pellets), Qala'at Sheisar, 1 July 2001, leg. J. Obuch; – 1 f (SMF 73240 [S+B+Sk]), Qala'at Sukkara, Jebel 'Abd al 'Aziz, 2 October 1988, leg. D. Kock; – 3 fa (NMP 48888–48890 [S+A]), Qantara, 30 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma (NMP 48891 [S+A]), Qasr Ibn Wardan, 31 May 2001, leg. M. Andreas, P. Benda, A.

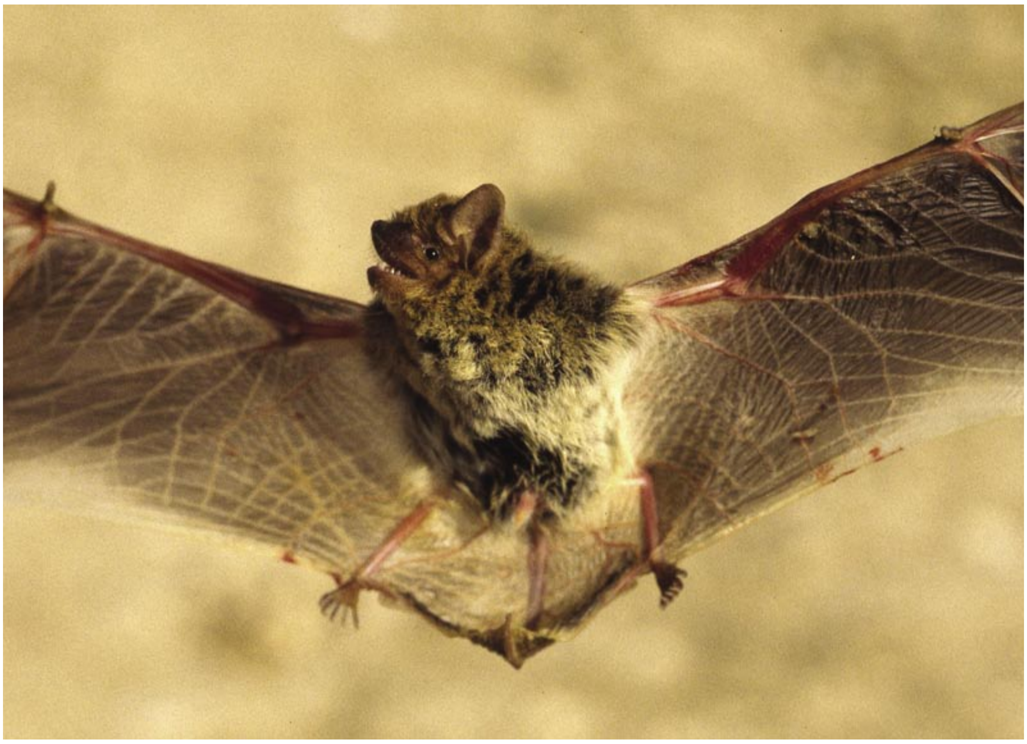


Fig. 130. Portrait of *Pipistrellus kuhlii* (Kuhl, 1817) from Qala'at Ja'Abar (photo by A. Reiter).

Reiter & D. Weinfurtová; – 2 ma, 1 fa (NMP 48929–48931 [S+A]), Qatura, 2 June 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ms, 1 mj, 7 fa, 3 fs, 1 fj (NMW 26294–26306 [S+A]), Rakka (= Raqqa), 28 June 1910, leg. V. Pietschmann, Mesopotamien-Expedition 1910; – a maxillary fragment (SMF 90487), Raqqa, leg. C. Becker; – 9 inds. (SMF 84413–84421, from owl pellets), Raqqa, "Eulenschacht" cave, 18 March 1996, leg. C. Ebenau; – 1 ind. (SMF 84495, from owl pellets), Rasafah, 28 March 1996, leg. C. Ebenau; – 6 ma, 1 fa, 5 mj, 1 fj (NMP 47993–48005 [S+A]), Rasafah, 16 June 1998, leg. M. Andreas, P. Benda & M. Uhrin; – 23 inds. (NMP 90384; 10 skulls, 7 rostra, 6 right maxillae, 5 left maxillae, 22 left mandibles, 18 right mandibles, from owl pellets), Rasafah, 16 June 1998, leg. J. Obuch; – 4 inds. (ISEA M/11771–11780; 4 rostra, 3 left mandibles, 3 right mandibles, from owl pellets), Rasafah, 27 June 1998, leg. A. Shehab; – 10 ma, 2 fs (NMP 48948, 48949, 48951, 48952 [S+A], 48950, 48953–48959 [A]), Rasafah, 13 April 2001, leg. P. Munclinger & P. Nová; – 22 inds. (NMP 90388; 21 skulls, right maxilla, 20 right and 17 left mandibles, from owl pellets), Rasafah, 14 April 2001, leg. J. Obuch; – 5 ma, 4 fa (NMP 48784–48786, 48789, 48790 [S+A], 48787, 48788, 48791, 48792 [A]), Rasafah, 13 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ind. (RLC SY9 [A]), Rasafah, 9 October 2004, leg. R. Lučan; – 2 ma (NMP 48947, 49987 [S+A]), Ras al Bassit, 29 April and 3 June 2001, leg. R. Lučan, M. Andreas & A. Reiter; – 2 ma, 2 fa (NMP 48884–48887 [S+A]), Safita, 29 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 3 ma, 1 fs (NMP 48800–48802 [S+A], 48803 [A]), Sbeikhan, 15 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 ma, 5 fa (NMP 48837–48842 [S+A], 48843 [A]), Tadmor, 20 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ind. (NMP 90385; left mandible, from owl pellet), Tadmor, 23 April 2001, leg. J. Obuch; – 3 fa (NMP 48862–48864 [S+A]), Talsh'hab, 25 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 ma, 2 fa, 1 fj (NMP 48032–48035 [S+A], 48036 [S+B]), Tell Sheikh Hamad, 19 June 1998, leg. M. Andreas, P. Benda & M. Uhrin.

Morphology. See Table 29 and Appendix III for biometric data on the Syrian specimens of *Pipistrellus kuhlii*. A specimen from an owl pellet (SMF 84481) has a bicuspid first upper incisor (I^1) and lacks the second one. This case differs from the typical state in *P. kuhlii* which possess unicuspid I^1 and small I^2, reaching ca. $^1/_3$ of the I^1 crown height. Out of the five *Pipistellus*-like bat species in the Near East with the I^1 bicuspid, *Pipistrellus pipistrellus*, *Hypsugo arabicus* (Harrison, 1979), and *H. bodenheimeri* (Harrison, 1960) are clearly smaller in their skull dimensions. The specimen differs from *Hypsugo savii* by the following: a longer rostrum with interorbital part narrowing further proximally; smaller anteorbital foramen lying above M^1; sulcus on rostrum instead of shallow depression, postdental palate long; P^4 shorter, no hypocone. The specimen clearly represents *P. kuhlii* despite the aberrant I^1 (see also Kock et al. 1972). The bacula extracted from the specimens of *P. kuhlii* from different parts of Syria are shown in Fig. 120. Their sizes and shapes conform to findings by Lanza (1959a), Gaisler et al. (1972), Hill & Harrison (1987) and/or Harrison & Bates (1991) from various parts of the distribution range. Pelage of a male individual (NMP 48814) collected in the ruins of Qala'at ar Rahba has melanistic coloration; dark brown to black both on dorsal and ventral sides, wing membranes were dark brown.

Taxonomy. *Pipistrellus kuhlii* has recently been considered to be restricted mostly to the Palaearctic (Kock 2001b, Simmons 2005), see Distribution. Three to four subspecies are recognised within this range (Koopman 1994, Simmons 2005); viz. *P. k. kuhlii* (Kuhl, 1817) (terra typica: Triest [NE Italy]), *P. k. marginatus* (Cretzschmar, 1830) (t.t.: Cretzschmar 1830 proposed 'Nubien und das petraeische Arabien' but Anderson 1902 restricted the t.t. to 'Egypt'), *P. k. lepidus* (Blyth, 1845) (t.t.: Kandahar, Afghanistan), and *P. k. ikhwanius* Cheesman et Hinton, 1924 (t.t.: Hufuf Town, Hasa, Central Arabia [NE Saudi Arabia]), although Corbet (1978) listed only the nominotypical form in the whole range (of that time, i.e. incl. the African populations, recently separated to *P. hesperidus* (Temminck, 1840) see Kock 2001b).

Taxonomy of *P. kuhlii* in the whole Palaearctic range has not yet been evaluated properly. Traditionally, all four above mentioned subspecies have been reported to occur in the Middle East (Thomas 1907, Cheesman & Hinton 1924, Ellerman & Morrison-Scott 1951, Sanborn & Hoogstraal 1953, 1955, Weber 1955, Harrison 1955, 1964a, 1956c, Bodenheimer 1958, Hatt 1959, Lewis & Harrison 1962, Atallah 1967, 1977, Gaisler 1970, Hayman & Hill 1971, Kock et al. 1972, Nader 1975, 1990, DeBlase 1980, Nader & Kock 1983c, Qumsiyeh 1985, Tohmé

Table 29. Basic biometric data on examined Syrian and comparative samples of *Pipistrellus kuhlii* (Kuhl, 1817). For abbreviations see pp. 10, 11

	Syria					Near East (other than Syria)					Egypt & Cyrenaica				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	123	**34.77**	32.1	36.8	0.916	46	**34.19**	31.1	36.2	1.304	35	**33.98**	31.0	36.4	1.135
LCr	115	**13.25**	12.37	13.88	0.289	48	**13.01**	12.45	13.71	0.292	36	**13.20**	12.57	13.84	0.324
LCb	115	**12.81**	12.05	13.37	0.301	48	**12.53**	12.00	13.22	0.288	36	**12.78**	12.18	13.43	0.314
LaZ	82	**8.65**	8.07	9.24	0.218	30	**8.47**	8.02	8.83	0.205	27	**8.72**	8.24	9.27	0.251
LaI	125	**3.34**	3.12	3.60	0.094	48	**3.28**	3.04	3.53	0.111	36	**3.31**	3.02	3.55	0.119
LaN	125	**6.63**	5.93	7.02	0.154	48	**6.54**	6.28	6.96	0.158	36	**6.55**	6.34	6.85	0.142
ANc	103	**4.69**	4.18	5.16	0.168	48	**4.58**	4.25	5.08	0.150	35	**4.69**	4.40	5.24	0.155
CC	110	**4.19**	3.64	4.55	0.181	47	**4.09**	3.77	4.44	0.162	36	**4.27**	3.87	4.65	0.170
M^3M^3	110	**5.62**	5.08	5.99	0.200	48	**5.54**	5.19	5.87	0.167	37	**5.72**	4.95	6.18	0.215
CM^3	126	**4.92**	4.50	5.21	0.140	48	**4.80**	4.48	5.15	0.137	37	**4.93**	4.52	5.27	0.167
LMd	126	**9.55**	8.54	10.27	0.265	45	**9.38**	8.90	9.85	0.219	36	**9.58**	8.92	10.13	0.300
ACo	111	**2.97**	2.63	3.31	0.140	46	**2.90**	2.63	3.18	0.124	36	**3.06**	2.67	3.31	0.142
CM_3	126	**5.26**	2.93	5.59	0.248	47	**5.17**	4.93	5.50	0.116	37	**5.27**	4.98	5.58	0.142

	Balkans					Southern Europe					Maghreb & Tripolitania				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	38	**33.76**	31.8	35.5	0.875	50	**34.34**	32.1	36.5	1.001	47	**33.77**	31.1	35.7	1.207
LCr	44	**13.21**	12.87	13.52	0.189	60	**13.23**	12.32	13.92	0.318	51	**13.06**	12.52	13.80	0.296
LCb	46	**12.80**	12.40	13.38	0.226	60	**12.79**	11.83	13.55	0.365	50	**12.63**	12.13	13.34	0.287
LaZ	35	**8.62**	8.32	8.95	0.180	40	**8.50**	7.82	9.03	0.264	35	**8.52**	8.18	8.96	0.218
LaI	46	**3.24**	2.98	3.57	0.123	61	**3.23**	2.98	3.48	0.118	51	**3.26**	2.97	3.48	0.114
LaN	46	**6.59**	6.28	6.95	0.159	61	**6.55**	6.20	6.93	0.147	51	**6.45**	6.12	6.92	0.155
ANc	44	**4.77**	4.57	5.07	0.124	60	**4.73**	4.32	5.03	0.152	50	**4.66**	4.32	5.07	0.169
CC	46	**4.25**	4.03	4.48	0.099	59	**4.27**	3.88	4.61	0.135	48	**4.18**	3.68	4.59	0.174
M^3M^3	45	**5.58**	5.17	5.75	0.124	59	**5.61**	5.28	5.92	0.159	50	**5.63**	5.32	5.93	0.159
CM^3	46	**4.97**	4.82	5.18	0.096	61	**4.98**	4.40	5.23	0.146	51	**4.84**	4.51	5.27	0.160
LMd	46	**9.64**	9.37	10.07	0.170	59	**9.61**	8.87	10.15	0.263	50	**9.44**	8.88	10.02	0.240
ACo	46	**3.04**	2.77	3.32	0.128	59	**3.02**	2.47	3.37	0.164	50	**3.03**	2.72	3.39	0.142
CM_3	46	**5.37**	5.25	5.50	0.070	61	**5.35**	4.72	5.72	0.151	50	**5.22**	4.91	5.63	0.155

& Tohmé 1985, Nadachowski et al. 1990, Harrison & Bates 1991, Qumsiyeh et al. 1992, 1998, Koopman 1994, Steiner & Gaisler 1994, Qumsiyeh 1996, Ferguson 2002), see also the review by Benda & Horáček (1998).

Pelage and membrane coloration is considered as the main character distinguishing the particular subspecies in *P. kuhlii* (Cheesman & Hinton 1924, Sanborn & Hoogstraal 1953, Harrison 1955, 1956c, 1964a, Lewis & Harrison 1962, Felten & Storch 1970, Gaisler et al. 1972, Kock et al. 1972, Qumsiyeh 1985, Harrison & Bates 1991, Bogdanowicz 2004). *P. k. kuhlii* is described to be relatively dark and with a narrow pale rim of the wing membrane, while in *P. k. lepidus* and *P. k. ikhwanius* the coloration is much paler and the pale rim of the membranes broader. Thus, most frequently, the Mediterranean populations of the Middle East have been assigned to the nominotypical form while the populations inhabiting the deserts of the south and east of the Middle East to *P. k. ikhwanius* (Iraq, Arabia) and *P. k. lepidus* (Iran, extralimitally also Afghanistan, Pakistan, Transcaucasia, eastern Europe, and Central Asia).

Bodenheimer (1958) reported *P. k. kuhlii* from Palestine, Tohmé & Tohmé (1985) from Lebanon, Weber (1955) and Hatt (1959) from Iraq and Sanborn & Hoogstraal (1953) from Yemen while Atallah (1967) mentioned *P. k. ikhwanius* from Jordan and Atallah (1977) from the entire

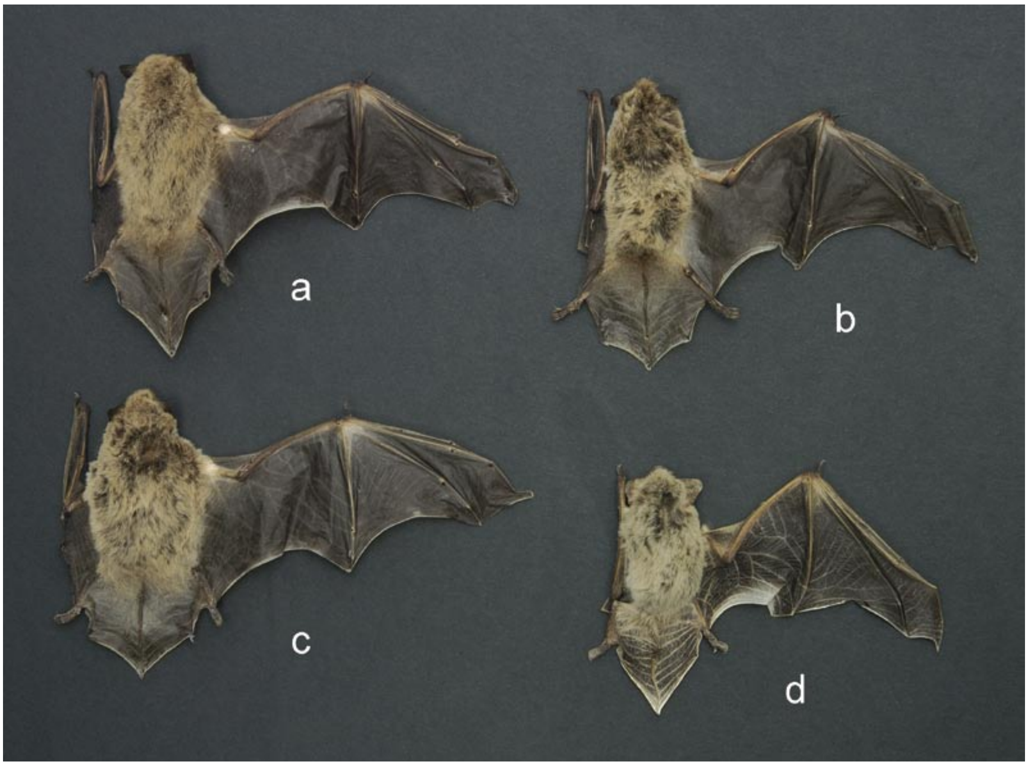


Fig. 131. Pelage coloration in *Pipistrellus kuhlii* (Kuhl, 1817): a – male, NMP 48907, Syria, Bainyas; b – male, NMP 48036, Syria, Tell Sheikh Hamad; c – female, NMP 48809, Syria, Abu Kamal; d – male, NMP 91343, Azerbaijan, Gobustan.

Levant, Nader & Kock (1983c) and Nadachowski et al. (1990) from Iraq, and Nader (1975) from central Saudi Arabia. Harrison (1956c, 1964a) and Ferguson (2002) considered all the Arabian populations (incl. those of Palestine, Syria and Iraq) to belong to *P. k. ikhwanius*.

The Syrian populations of *P. kuhlii* have not yet been taxonomically assessed; only von Wettstein (1913) found the coloration in Syrian bats to be paler than in Europen ones and the pale rim of wing membrane broader. Our examination of rather numerous Syrian samples of *P. kuhlii* (see the Material examined) showed a more or less similar morphotype in coloration throughout the country. The Mediterranean, western Syrian bats have only a slightly darker cinnamon-coloured dorsal pelage than the desert, eastern Syrian ones, in the coloration of ventral pelage both forms concur. Also the coloration pattern of wings is the same in both the desert and Mediterranean samples; the membranes are dark brown with an approx. 1 mm wide pale rim on plagiopatagia and very narrow pale rims along dactylo- and uropatagia (Fig. 131). In skull and body size the Syrian bats concur with other Mediterranean and Middle Eastern populations (Table 29).

Evaluating the systematic position of the Lebanese populations of *P. kuhlii*, Lewis & Harrison (1962) noted: “Examination of the considerable Middle Eastern material of this species […] reveals the presence of a quite well marked geographical cline between the typical race in Europe and the pallid desert race, *P. k. ikhwanius*, in Arabia. […] Material from Lebanon and Palestine also shows average paler pelage than *P. k. kuhli*. […] It seems more reasonable, in view of the cline here demonstrated, to regard the populations of *P. kuhli* in Lebanon and Palestine, where the shade of colour of the pelage is rather variable, as being intermediate between *P. k. kuhli* and *P. k. ikhwanius* and certainly nothing would be gained by any attempt to separate any of these ill defined intermediate stages of the cline taxonomically." This conclusion was also presented later by Harrison & Bates (1991). On the other hand, Qumsiyeh (1985) examining bats from Egypt, the Levant and Arabia, stated a considerable variability in cranial (dental) and external features and in coloration. He concluded: "[…] the characters used to distinguish the Egyptian populations of *Pipistrellus kuhli* from those from Palestine and Arabia (*P. k. ikhwanius*) are individually variable. Specimens from northern Egypt and northeastern Mediterranean (Lebanon, Syria and Turkey) are dark in the color of the fur and the membranes. The specimens from Arabia and Sinai are light in color, but intergrade into the darker forms in the Eastern Mediterranean. The color is correlated with the climate, paler specimens coming from the desert regions. Likewise, the size is largest in cool, humid climates and smaller in hot, dry climates. In view of the continuity of range and the abundance of this species, it seems likely that the other pale forms (for example, *lepidus*) might prove to be synonymous. With the material available to me, I could only synonymize *ikhwanius* with the Egyptian populations of *P. kuhli*. The name available for this Egyptian population is […] *marginatus* Cretzschmar, 1830."

If we stick to the conservative taxonomy, the desert Syrian bats do not belong to any 'desert pale subspecies' (cf. *ikhwanius*, *lepidus*) and represent the intermediate form *sensu* Lewis & Harrison (1962). The type of coloration of the Syrian bats also most resembles that from Cyprus mentioned as an example of the intermediate form by the latter authors. To apply conclusions by Lewis & Harrison (1962) and Qumsiyeh (1985), the large distance cline continuum in coloration changes and in body size throughout the Mediterranean and Middle East says rather for a simplification of the specific taxonomy, i.e. to consider all Palaearctic populations belonging to the nominotypical form (cf. Corbet 1978, Qumsiyeh et al. 1992, 1998, Benda & Horáček 1998).

As Benda & Horáček (1998) already concluded, although *P. kuhlii* represents one of the most common species throughout the Mediterranean and belongs to one of the index species of that region and moreover, in Central and Eastern Europe it has even expanded its range during the last decades (Strelkov et al. 1985, Strelkov & Il'in 1990, Bauer 1996, Fiedler et al. 1999, Voloh 2002, Sachanowicz et al. 2006, etc.), a profound analysis of its geographic variation is missing. However, since the distribution range of *P. kuhlii* is not noticeably segmented and represents a continuum where clinal shifts in particular characters are present, this analysis should be focused on variation in certain genetic markers throughout the species range. In spite of the rapid range changes known in the recent area of distribution, only such analysis can reveal a possible inner discontinuity or even fragmentation across and/or within the described character clines. Perhaps only such findings could indicate possible primary refugia of the origin of the currently unbroken range and thus point out some related intraspecific variation.

A partial genetic comparison, covering a small portion of the species range including that of the Middle East, was preliminarily published by Benda & Ruedi (2004). This comparison showed an apparent genetic uniformity among the populations of the Middle East from Syrian Upper Mesopotamia to the Persian Baluchestan. In this more than 2000 km long belt of arid regions, only two haplotypes of the mitochondrial gene (complete cytochrome *b* gene; cf. Stadelmann et al. 2004) were found, differing in 0.16%. In the specimens from Mesopotamia (from Syria and Iran, i.e. at a distance of ca. 1000 km), the same haplotype was detected. Genetic distances between the Middle Eastern and the Mediterranean (European and African) samples was 3.23–4.03% (mean 3.51%). These tentative results suggest a relatively fast history of spreading of *P. kuhlii* within the Middle East and thus indicate a rather simple intraspecific taxonomy within this region, similarly as the above mentioned morphological comparisons. However, the conspicuous genetic distance between the Mediterranean populations and those of the Middle East could suggest different taxa in these regions. The prior name for designation of the Middle Eastern populations most probably remains *P. k. lepidus* (Blyth, 1845) (Benda & Ruedi 2004).

FEEDING ECOLOGY. *Pipistrellus kuhlii* is an aerial hawking bat (Norberg & Rayner 1987), generalist consuming a wide range of insect taxa (Beck 1995, Whitaker et al. 1994, Feldman et al. 2000, Bogdanowicz 2004). The most important prey categories include representatives of the orders Diptera, Lepidoptera, Hymenoptera (especially Formicoidea), and Coleoptera (Rakhmatulina 1983, Whitaker et al. 1994, Beck 1995, Feldman et al. 2000, Goiti et al. 2003, Rahmatulina 2005).

We studied 16 faeces samples of *P. kuhlii* from different parts of Syria and recorded a considerable regional variation. In general, Auchenorrhyncha, Coleoptera, Hymenoptera, and Lepidoptera seem to be the most important food items. The proportional representation of particular prey categories in total sample is shown in Fig. 132.

Despite of that, we also found samples in which some of those generally highly contained items were nearly or completely absent and their role in the food was replaced by several other taxa. We found samples with very important proportions of Odonata, Heteroptera and/or Orthoptera. Analysis of the samples obtained at the sites visited repeatedly and in different seasons showed an obvious seasonal variation in the diet composition of *P. kuhlii* (Fig. 133). As far as the differences between the Mediterranean western part and the semi-desert eastern part of the country is concerned, we found a lower quantity of Auchenorrhyncha and Lepidoptera in the diet of bats in western Syria and a lower proportion of Hymenoptera (mostly Formicoidea) in the east (Fig. 134).

Contents of 70 digestive tracts from specimens collected in Syria were studied, but no important difference from the faeces analysis was found. Only a sample of three individuals from the Qala'at Ja'bar castle situated on the shore of Lake Assad, from which faeces were not collected, is quite

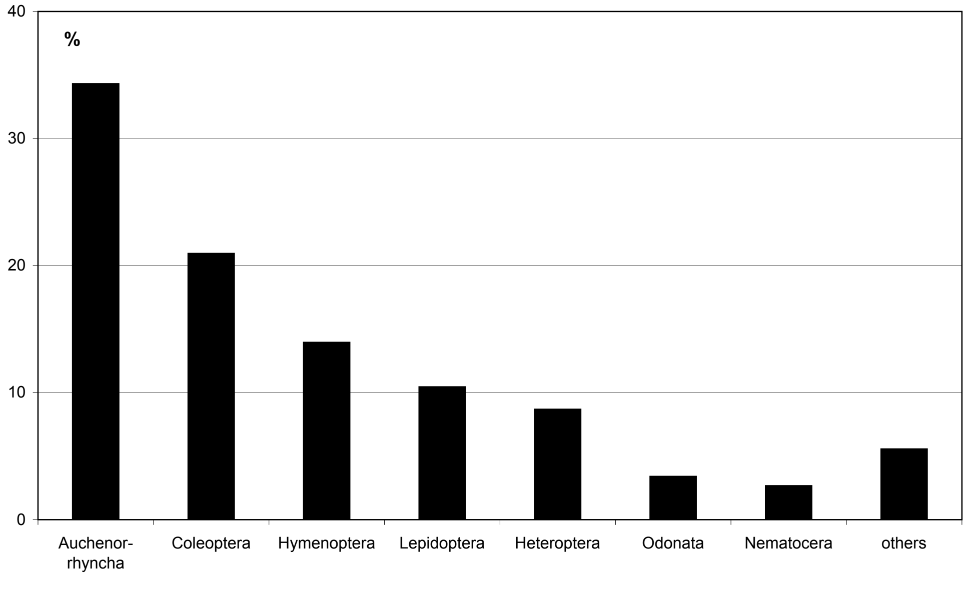


Fig. 132. Volume of particular food items in the diet of *Pipistrellus kuhlii* (Kuhl, 1817) from Syria.

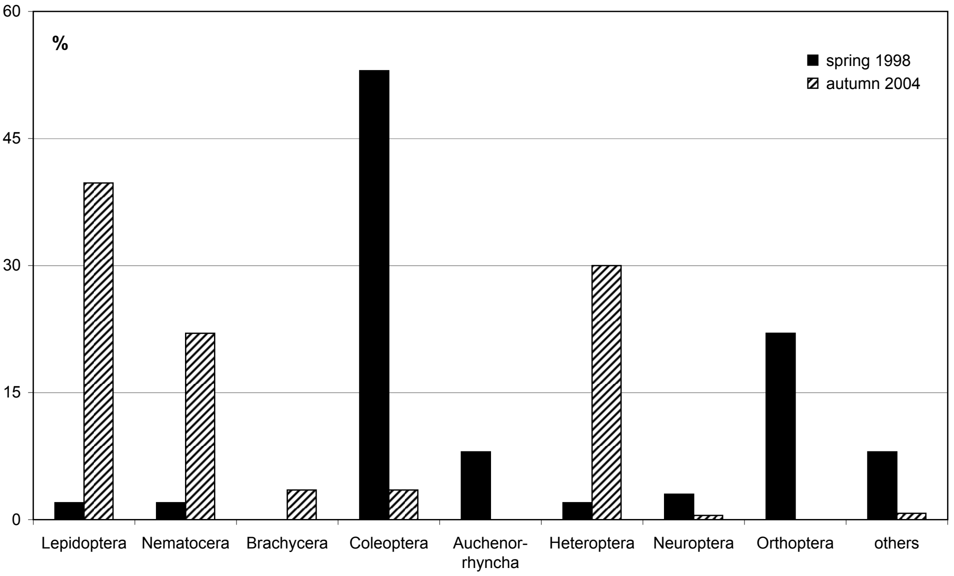


Fig. 133. Volume of particular food items in the diet of *Pipistrellus kuhlii* (Kuhl, 1817) at one site, the ruins of Rasafah, in two different seasons.

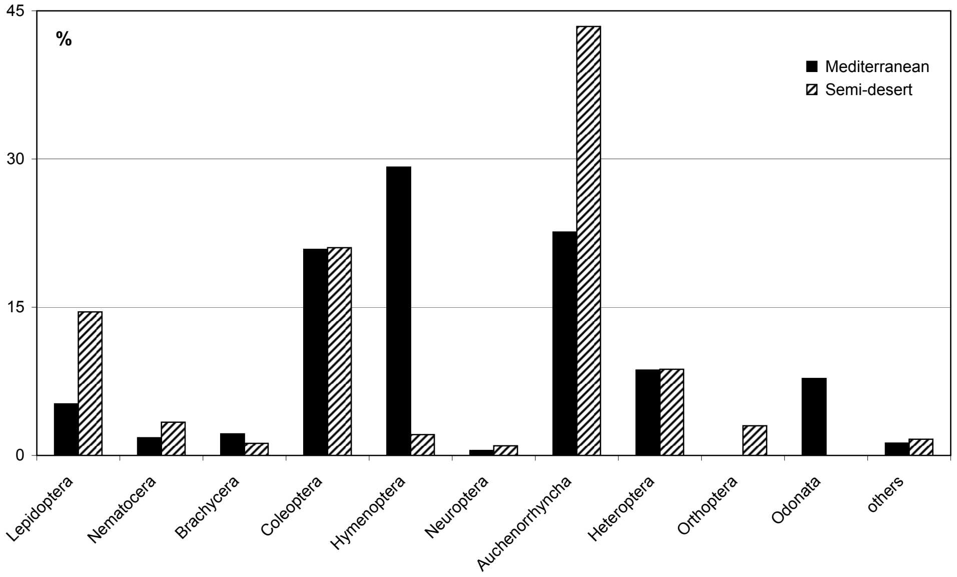
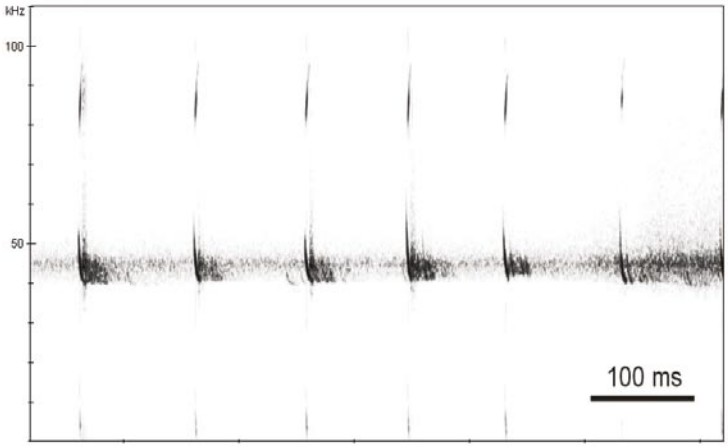


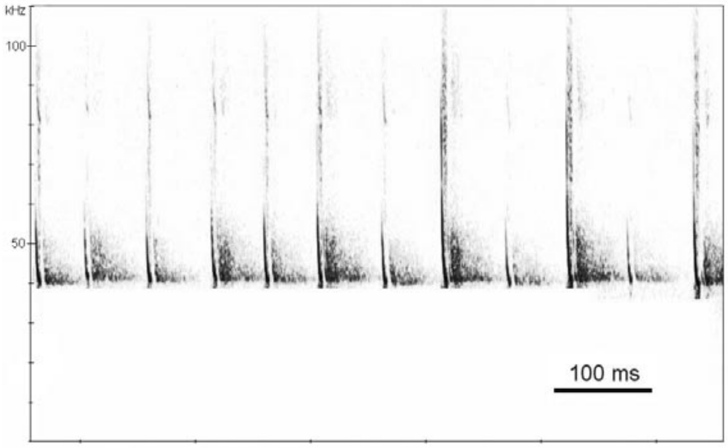
Fig. 134. Volume of particular food items in the diet of *Pipistrellus kuhlii* (Kuhl, 1817): differences between the diet composition found in the Mediterranean (western) and semi-desert (eastern) parts of Syria.

different from the results of other diet analyses of *P. kuhlii* in Syria. Small swarming Nematocera, mostly Chironomidae, dominated in the sample (90% of the volume). Such food item is quite rare in the Syrian diet analyses and this finding suggests that if it is available, *P. kuhlii* prefers to hunt this prey above still waters similarly as many aerial hawkers throughout the world.

The most important attribute of the feeding ecology of *P. kuhlii* is the enormous flexibility within its hawking strategy. Extraordinarily high proportions of some particular food items recorded in certain samples indicate selective foraging and testify the conclusion by Goiti et al. (2003) that regarded *P. kuhlii* as a 'selective opportunist'.

Echolocation. Recordings of echolocation calls of *Pipistrellus kuhlii* were made at eight sites in Syria; Jabla (15 October 2004; Fig. 135), Baniyas (17 October 2004; Figs. 136, 137), Tadmor

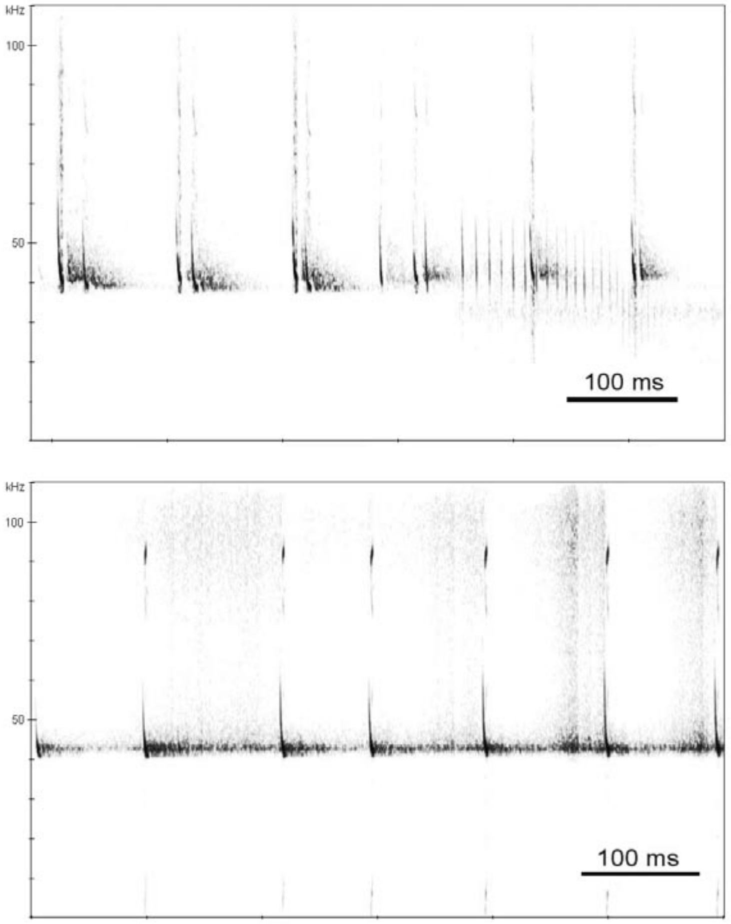




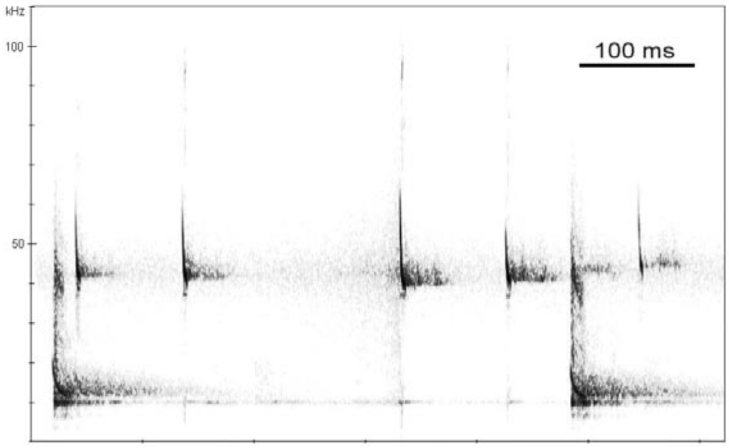
Figs. 135, 136. Spectrograms of echolocation calls of *Pipistrellus kuhlii* (Kuhl, 1817). 135 (above) – an individual flying around its roost crevice in a city building of Jabla. 136 (below) – an individual foraging close to riparian vegetation at Baniyas.

(7 October 2004; Figs. 138, 139), Qala'at al Marqab (16 October 2004; Figs. 140,141), Qala'at Salah ad Din (13 October 2004; Fig. 142), Rasafah (8 October 2004; Fig. 143), Yabroud (10 October 2004), and Ras al Bassit (11 October 2004; Fig. 144). The results of call analyses are given in Table 15.

At most places, many individuals foraged simultaneously within the range of the bat detector. Typical male social signals emitted in order to attract females and usually connected with a noticable flight behaviour of the signaling animals were recorded at some places (Rasafah, Jabla). Moreover, these 'singing' males often night-roosted in a very close proximity, no more than few tens of centimetres apart from each other. Random inspections of such males confirmed their sexual maturity (enlarged testes and caudae epididymidis). Individuals of *P. kuhlii* were recorded flying



Figs. 137, 138. Spectrograms of echolocation calls of *Pipistrellus kuhlii* (Kuhl, 1817). 137 (above) – two simultaneously foraging individuals (a typical terminal buzz of one of them in the right part of the picture) at Baniyas. 138 (below) – an individual of *P. kuhlii* foraging in the palm grove in the oasis of Tadmor.


kHz
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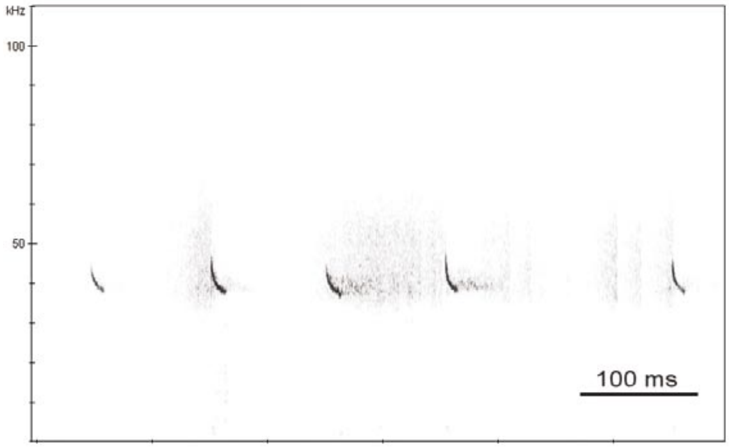
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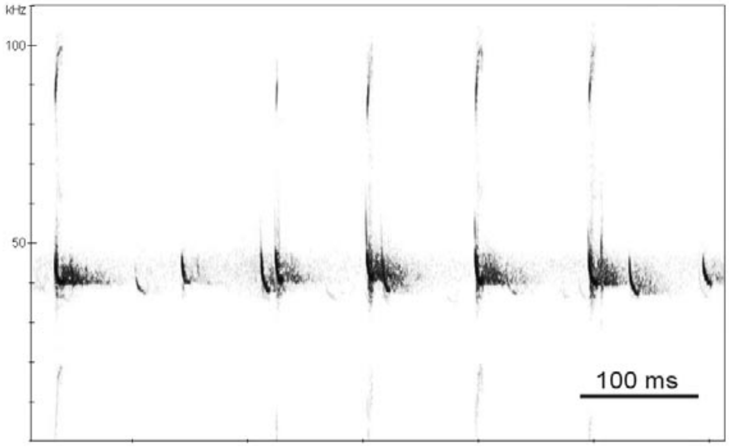
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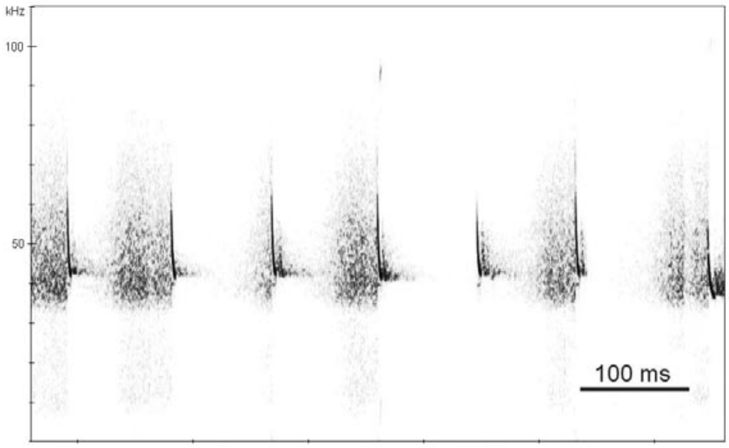
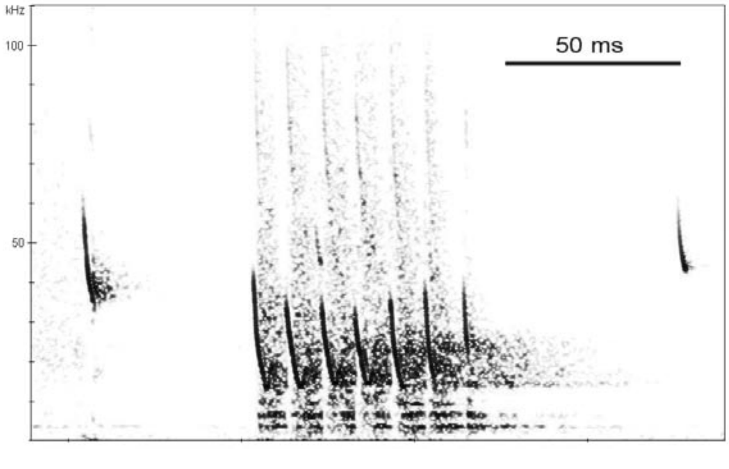
Figs. 139–141. Spectrograms of echolocation calls of *Pipistrellus kuhlii* (140, 141) and of *P. kuhlii* and *Tadarida teniotis* (139). 139 (above) – individuals of *P. kuhlii* and *T. teniotis* foraging above the oasis of Tadmor. 140 (middle) – an individual of *P. kuhlii* flying in open space at the Qala'at al Marqab castle; typical less frequency-modulated signals (FM/QCF type). 141 (below) – two simultaneously hunting individuals at Qala'at al Marqab show evidence of the jamming avoidance performed via shift in frequencies with maximum energy. The first (the "higher" one) of Fmax=41.0 kHz and the second (the 'lower'one) of Fmax=39.0 kHz.

in open space, most frequently near vertical objects such as riparian vegetation, trees, rock cliffs, and buildings. They were also frequently observed foraging around street lamps.

The parameters of echolocation calls in Syrian *P. kuhlii* were found similar to those described for European populations (Schnitzler et al. 1987, Zingg 1990, Russo & Jones 2002, Jahelková 2003, Obrist et al. 2004, etc.). The least variation, when compared with these descriptions, was found in the frequencies with maximum energy. Since the only species which could be confused





Figs. 142, 143. Spectrograms of echolocation calls of *Pipistrellus kuhlii* (Kuhl, 1817). 142 (above) – FM signals of an individual foraging close to vegetation at Qala'at Salah ad Din. 143 (below) – songflight of an individual male at Rasafah.

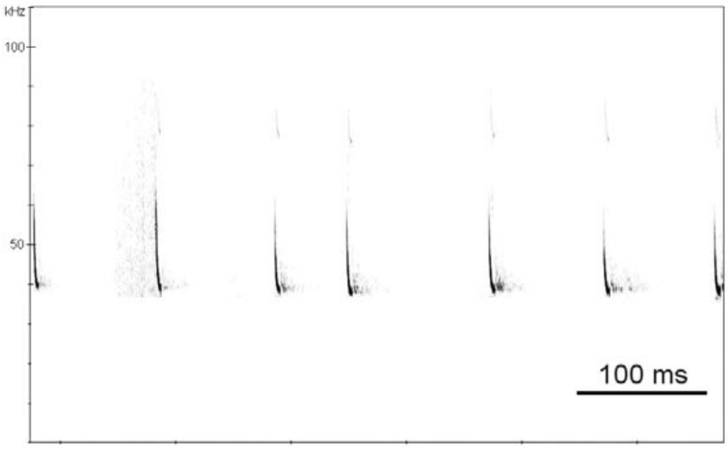


Fig. 144. Spectrogram of echolocation calls of *Pipistrellus kuhlii* (Kuhl, 1817): an individual foraging close to riparian vegetation at Ras al Bassit.

with *P. kuhlii* in the Middle East is *Pipistrellus nathusii* (Keyserling et Blasius, 1839), i.e. the species not known to occur in Syria or close regions (see Benda & Horáček 1998, DeBlase 1980), an exact identification of *P. kuhlii* could be made in the field even with a help of basic heterodyne bat detectors. Jamming avoidance reached by shifts in the peak frequencies as described by Ulanovsky et al. (2004) in *Tadarida teniotis*, was recorded in *P. kuhlii* when a higher number of individuals foraged simultaneously at one site (see above).

Based on our observations in Rasafah and Jabla, it seems probable that males perform lekking behaviour during the mating period: many individuals (presumably the sexually mature males) emit their attracting 'songs' in close proximity to each other. This interesting phenomenon, unique among microbats, was also observed in this species by Azurtza et al. (2004) in Spain and in closely related *Pipistrellus nathusii* by Jahelková (2005) in Central Europe.

Nyctalus noctula (Schreber, 1774)

Records. **Original data**: Tartus: Safita [1], fortress church, 29 May 2001: obs. colony of ca. 15 inds.; – Safita, above a river ca. 5 km to SE [2], 29 May 2001: net. 2 ma, 2 faG. – **Published data**: Quneitra / Golan Heights: Golan Heights and Mount Hermon, two unidentified records mapped in central and northern parts of this region [roughly the areas of Mount Hermon and Gamla]; Golan, no date: a colony of 500 f, 22 June 1995: 1 faL; 16 June 1996: breeding colony of at least 17 inds. (Mendelssohn & Yom-Tov 1999).

Distribution. **General**. Traditionally, *Nyctalus noctula* is a species with West Palaearctic and North Oriental type of distribution (Corbet 1978, Koopman 1994, Horáček et al. 2000, Gebhard & Bogdanowicz 2004). Its European range consists of a zone of broad-leaved forests from northern Iberia, Ireland and southern Scandinavia, over central and eastern Europe to the Ural Mts; it marginally reaches southern Europe and the Near East; in Asia it ranges from the Caucasus region and southwestern Siberia, over northern Iran and Central Asia, to China and Japan in the north, and Kashmir, Nepal, Burma and possibly Malaya in the south (Koopman 1994, Horáček et al. 2000, Bates & Harrison 1997; cf. Medway 1969). However, this concept very probably comprises more than one species (Koopman 1994).

Near East. *N. noctula* is one of the most rarely found bats in the Near East, it has been recorded no more than ten times there. All the records known are concentrated to the northern Levant from Cilicia to central Palestine, including Cyprus. In Palestine, *N. noctula* reaches the southernmost margin of its regular distribution range.

In Iran, this bat has been reported exclusively from the forested areas of northern slopes of the Elborz Mts and of the Caspian Plain, apart from the region of the Near East *proper* (DeBlase 1980). In western and southern Iran as well as in Iraq and Jordan (Amr et al. 2004), *N. noctula* has never been found.

The records of *N. noctula* available from Turkey come from two widely separated regions; the occurrence in Turkish Thrace (Albayrak 1993, Benda & Horáček 1998) connects more or less common distribution in the eastern Balkans (see Hanák et al. 2001, Benda et al. 2003a). Only two findings were made in southern Anatolia: near Tarsus in Cilicia (Osborn 1963) and in the Euphrates Valley near Adiyaman (Obuch 1994).

N. noctula was once reported from Lebanon, from the Natural Bridge near Faraya (Harrison 1962, Lewis & Harrison 1962), and twice from Palestine, in a cave on Jebel Qarantal near Jericho (Festa 1894) and in the Hahula Nature Reserve, Hula Valley (Harrison & Makin 1988). Spitzenberger (1979) mentioned three specimens of *N. noctula* from Cyprus.

The southernmost indisputable record of *N. noctula* in the Middle East and also in its Palaearctic range was reported from the Masirah Island, Oman (Harrison & Jennings 1980). However,

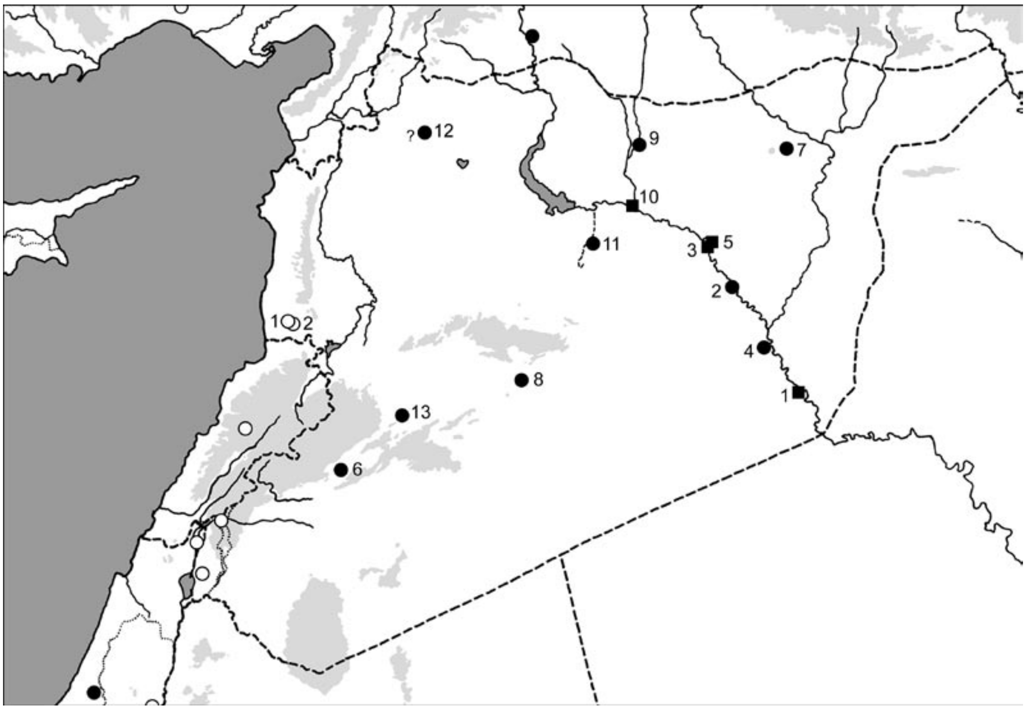


Fig. 145. Records of *Nyctalus noctula* (Schreber, 1774) (open symbols) and *Otonycteris hemprichii* Peters, 1859 (closed symbols) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

the authors considered this individual to be an accidental vagrant whose extraordinary migration might have been caused by an unusual weather conditions.

Syria (Fig. 145). *N. noctula* is a rare bat in Syria, four records are known from the country (Table 1). In Syria, it was previously known only from two findings in the Golan Heights (Mendelssohn & Yom-Tov 1999). From Syria *proper*, this species is here mentioned for the first time. All the records of *N. noctula* come from the Mediterranean woodland zone where they connect a few of the Palestinian and Lebanese findings (Harrison & Bates 1991).

The group of the Levantine records of *N. noctula* made between Cilicia in the north and Judea in the south (incl. Cyprus) seems to represent an isolated spot of occurrence. This small range should be well separated from the main area of species distribution – the nearest findings are known from Turkish Thrace and continental Greece in the west, and in the Caucasian and Caspian Regions in the north and northeast (see above). The findings of pregnant and/or lactating females or even nursery colonies among the limited Levantine records suggest a non-migratory character of this population and thus, its possible insulation from the northern parts of the species range (see also Taxonomy).

FIELD NOTES. The only roost of *Nyctalus noctula* known from Syria was discovered on 29 May 2001 in a ceiling crevice in the second-floor hall of the approximate height of 5–6 m, where a colony of roughly 15 individuals was observed (in the same room but in a different fissure a colony of *E. serotinus* was discovered). Four specimens netted the same day above a river ca. 5 km south-east of the town of Safita (together with *E. serotinus*, *P. kuhlii* and *M. schreibersii*) might have come from this colony. Out of these bats, two were pregnant females, each carrying two foeti of the crown-rump length of 18–20 mm. Mendelssohn & Yom-Tov (1999) reported on the catch of a lactating female on 22 June 1995. These authors also mentioned the finding of a breeding colony in the Golan Heights, some of the females being pregnant and others just after birth, on 16 June 1996. At another place in their book, they mentioned the size of the colony of about 500 females, but it is not fully clear whether this number is related to the same colony or represents e.g. a migratory group. In the Middle East, *N. noctula* has been known from owl diet from Turkey (Obuch 1994), however, no similar data are available from Syria.

MATERIAL EXAMINED. 2 ma, 2 fa (NMP 48876–48877 [S+A], 48879 [S+B]), Safita, 29 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová.

MORPHOLOGY. See Table 30 and Appendix III for biometric data on the Syrian specimens of *Nyctalus noctula*. Baculum extracted from a specimen of *N. noctula* from Syria is shown in Fig. 120. This preparation does not differ from those of European populations published by Topál (1958), Lanza (1959a), Bates & Harrison (1997), and/or Smirnov & Tsytsulina (2003).

TAXONOMY. *Nyctalus noctula* is considered a polytypic species with a number of subspecies (Ryberg 1947, Ellerman & Morrison-Scott 1951, Corbet 1978, Koopman 1994, Horáček et al. 2000, Gebhard & Bogdanowicz 2004, Simmons 2005). Most often, six subspecies are recognised within its distribution range, viz. *N. n. noctula* (Schreber, 1774) (terra typica: France), *N. n. labiatus* (Hodgson, 1835) (t.t.: Nepal), *N. n. plancei* (Gerbe, 1880) (t.t.: Pekin, Chihli, China), *N. n. meklenburzevi* Kuzjakin, 1934 (t.t.: Taškent [Uzbekistan]), *N. n. lebanoticus* Harrison, 1962 (t.t.: Natural Bridge, Faraya, Lebanon), and *N. n. furvus* Imaizumi et Yoshiyuki, 1968 (t.t.: Kado, Iwate, NE Honshu, Japan). However, the systematic position of some of them remains unclear, mostly in the eastern part of the species range, and more than one species within the current species content is expected, respectively (Yoshiyuki 1989, Corbet & Hill 1992, Gebhard & Bogdanowicz 2004, Simmons 2005).

Table 30. Basic biometric data on examined Syrian and comparative samples of *Nyctalus noctula* (Schreber, 1774). For abbreviations see pp. 10, 11

	Syria & Lebanon					Central Asia				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	5	**52.04**	50.3	54.5	1.532	8	**55.34**	54.7	56.2	0.529
LCr	5	**18.56**	18.12	19.22	0.474	8	**19.07**	18.58	19.61	0.365
LCb	5	**18.67**	18.37	19.12	0.336	8	**19.31**	19.00	19.79	0.308
LaZ	5	**13.37**	13.14	13.52	0.150	7	**13.49**	13.19	13.97	0.286
LaI	5	**5.16**	5.02	5.26	0.087	8	**5.13**	5.02	5.21	0.072
LaN	5	**10.01**	9.83	10.51	0.289	8	**10.28**	9.64	10.93	0.376
ANc	5	**6.75**	6.68	6.87	0.072	8	**7.08**	6.82	7.24	0.148
CC	5	**7.30**	6.92	7.53	0.239	8	**7.51**	7.24	7.88	0.208
M^3M^3	5	**8.71**	8.28	9.12	0.299	8	**8.91**	8.65	9.36	0.225
CM^3	5	**7.46**	7.32	7.68	0.157	8	**7.52**	7.27	7.76	0.153
LMd	5	**14.18**	13.98	14.48	0.187	8	**14.87**	14.58	15.17	0.214
ACo	5	**4.69**	4.52	4.82	0.122	8	**4.81**	4.60	5.11	0.155
CM_3	5	**7.87**	7.74	7.98	0.102	8	**8.03**	7.78	8.28	0.163
	Central Europe					Balkans				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	13	**52.19**	49.3	53.8	1.232	23	**53.77**	50.7	56.8	1.540
LCr	50	**18.43**	17.52	19.08	0.378	24	**18.63**	17.82	19.53	0.410
LCb	50	**18.59**	17.54	19.33	0.398	27	**18.90**	18.32	19.76	0.366
LaZ	36	**13.17**	12.59	13.89	0.314	17	**13.22**	12.60	13.74	0.357
LaI	50	**5.11**	4.69	5.43	0.154	28	**5.08**	4.79	5.44	0.156
LaN	50	**10.07**	9.57	10.76	0.279	28	**9.92**	9.21	10.59	0.288
ANc	49	**6.75**	6.28	7.19	0.185	27	**6.73**	6.32	7.27	0.220
CC	50	**7.24**	6.71	7.67	0.210	27	**7.33**	6.94	7.63	0.153
M^3M^3	50	**8.71**	8.28	9.11	0.186	28	**8.76**	8.33	9.18	0.232
CM^3	50	**7.31**	6.93	7.67	0.157	28	**7.35**	7.09	7.63	0.142
LMd	47	**14.24**	13.43	14.68	0.288	28	**14.44**	13.75	15.18	0.351
ACo	47	**4.50**	4.19	4.82	0.154	25	**4.57**	4.26	5.42	0.239
CM_3	47	**7.72**	7.32	8.10	0.171	28	**7.77**	7.43	8.17	0.167

In the western Palaearctic, three subspecies are regularly recognised (*noctula*, *meklenburzevi*, *lebanoticus*), although some authors (Bobrinskoy 1925, Ognev 1927, 1928, Ellerman & Morrison-Scott 1951, Serafiński 1958, Hanák 1964, Kuzjakin 1965) identified a fourth subspecies in eastern and northeastern Europe, *N. n. princeps* Ognev, 1923 (t.t.: Hrenovoe, Bobrovskij Uezd, Voronežskaja Gubernija [Russia]). However, justification of this subspecies was doubted already by Kuzjakin (1950) who pointed out that the differences found by Ognev & Vorob'ev (1923) were based on their different way of measurements taking and finally, on a comparison of incomparable data. The recognition of a separate subspecies in eastern Europe is namely unsubstantiated because of the repeated confirmation of the long distance migratory behaviour in *N. noctula*. It has been proved both directly by very numerous recaptures of banded bats (e.g. Sluiter & Van Heerdt 1966, Strelkov 1969, Panjutin 1980, Gebhard & Bogdanowicz 2004, Hutterer et al. 2005) and indirectly also by morphological and genetic analyses (Strelkov & Abramov 2001, Petit & Mayer 1999, 2000, Petit et al. 1999, 2001, Mayer et al. 2002). During seasonal migrations, the noctule populations of central and eastern Europe get mixed and although females exhibit a high level of philopatry, there is no genetic isolation of these parts of range due to male dispersion among colonies and hibernacula (Petit & Mayer 2000). Anyway, most of the recent authors consider the form *princeps* invalid and regard it a synonym of the nominotypical subspecies (Strelkov 1963, 1981, Corbet 1978, Strelkov et al. 1978, 2002, Koopman 1994, Horáček et al. 2000, Gebhard & Bogdanowicz 2004, Simmons 2005). On the other hand, the subspecies *N. n. meklenburzevi*, primarily described on the basis of much paler coloration in the samples from Central Asia (Kuzjakin 1934), has been recently confirmed to occur in the eastern part of Central Asia and in western Siberia, being composed of larger individuals than are the European noctules and of both dark and pale morphs (Strelkov et al. 2002). Moreover, the analysis by Strelkov et al. (2002) showed a unique position of Scandinavian populations of *N. noctula*, which has been also confirmed by genetic methods (Petit & Mayer 2000, Mayer et al. 2002).

Based on the known records, two isolated populations of *N. noctula* probably occur in the Near East (see also Distribution). In the north, noctules have been recorded in the areas adjacent to the Balkans and the Caucasus Mts (NW Turkey, N Iran) and in the south, several findings have been reported from the Levant (Cilicia, Cyprus, W Syria, Lebanon, N Palestine). As the northern belt of occurrence links up the European range of the species distribution, the nominotypical form is recognised there (Strelkov et al. 1978, DeBlase 1980). The Levantine populations should be assigned to *N. n. lebanoticus*, described from the Lebanon Mts (Lewis & Harrison 1962, Harrison 1964a, Atallah 1977, Harrison & Makin 1988, Harrison & Bates 1991, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Ferguson 2002). This form was described as being "similar in all essential characters and size to *N. noctula noctula* but decidedly darker in colour, both above and below. [...] The tips of the hairs on the back are distinctly darker than those of the typical race." (Harrison 1962: 337–338). The Syrian noctules undoubtedly belong to the population known primarily from Lebanon, in size they conform to the Lebanese and European samples (Table 30), however, they do not exhibit any extremely dark coloration, distinct from the European bats. Since the pelage coloration in *N. noctula* shows remarkable age and seasonal variations (based on our experience with noctules throughout the range), we do not regard this character to be important for a separation of a unique taxon in this species. However, as the Levantine records seem to be isolated from the rest of the species range, a separate position of this population is possible.

However, Strelkov (1997a, b, 1999, 2000) and Strelkov & Abramov (2001) suggested the southern parts of the distribution range of *N. noctula* in the western Palaearctic (i.e. southwards up to ca. 45° N, but ca. 40° N in the Caucasus region) to be a region where (1) no nursery colonies are formed, (2) mainly subadult individuals occur during summer, and (3) adult males and females meet and copulate during the hibernation period. The newly published and/or summarised data from southern Europe support these conclusions only partly (see Ruedi et al. 1998, Hanák et al. 2001, Mayer et al. 2002, Benda et al. 2003b, Scaravelli 2005): some noctules certainly can nurse their young in the southern regions (Iberia, Italy, Balkans) and these smaller parts of local populations perhaps can be labelled sedentary or facultatively migratory (sensu Gaisler & Hanák 1969), although otherwise *N. noctula* definitely is a migratory species according to Strelkov's (1969, 1971a) conclusions (see also the review by Hutterer et al. 2005).

The Levantine populations create nursery colonies regularly (see Records and Distribution): out of nine known Levantine records of *N. noctula*, at least one represents a direct finding of a nursery colony and two others are indirect findings – nettings of pregnant or lactating females. Such records support the hypothesis of the Levantine population as an isolated unit which occurs and breeds in its restricted area and most probably remains sedentary. On the other hand, the lack of evidence of the migratory behaviour in this population does not mean its real absence. Similarly as in more northern parts of the distribution range (see Petit & Mayer 2000), the Levantine females could be rather sedentary (one can suppose according to the described high philopatry in this sex) while the more migratory males could control a gene exchange with other populations of the species. However, their migrations may not be regular as they cannot follow phenological changes in the seasonal course (they should move for hibernation to the north!). Probably the only reliable alternative hypothesis is a more or less regular supplement of the Levantine population by migrants from the north – the Balkans or the Caucasus region.

All such speculations concerning position of the Levantine *N. noctula* (separate population vs. its regular or accidental migratory connection with the rest of the species range) could be probably solved only by a genetic analysis (continuing the well established data set, see Mayer et al. 2002). In the region of the Middle East, the recapture experiments with banded bats probably remain a less efficient alternative aimed to reveal a basis of the life history of this enigmatic population. However, an indirect suggestion of a possible separate rank of the Levantine noctules can be mentioned, based on the smell produced by an adult male captured in Lebanon, which markedly differed from that found in the European bats (I. Horáček, in verb.).

Feeding ecology. *Nyctalus noctula* is a large bat species with a fast hawking foraging strategy (Norberg & Rayner 1987, Gebhard & Bogdanowicz 2004). This bat often hunts above water (Gloor et al. 1995), feeding especially on Trichoptera, Diptera, Lepidoptera and Coleoptera (Beck 1995, Gloor et al. 1995, Mackenzie & Oxford 1995, Rydell & Petersons 1998, Gebhard & Bogdanowicz 2004).

In Syria, we collected individuals of *N. noctula* as well as their digestive tracts only at one site (5 km SE of Safita) and during one night. Therefore, we cannot make any general conclusions concerning the feeding ecology of this species in the Middle East. We found Heteroptera to be the most important food item accompanied with Coleoptera (mostly Scarabaeidae) and Lepidoptera. The analysis of digestive tract contents revealed a slightly higher volume of Lepidoptera and the presence of one more item, Trichoptera.

Although coming from a relatively humid region of Syria, the diet composition of *N. noctula* at the studied site is quite different from the results obtained in temperate parts of the species range and shows certain flexibility of feeding ecology in this species.

Otonycteris hemprichii Peters, 1859

Records. **Original data**: Deir ez Zur: As Salihiyyah [1], ruins of antique Dura Europos, 18–19 June 1998: 6 inds. from *Tyto alba* pellets; 19 April 2001: 7 inds. from *Tyto alba* pellets; – Ayyash [2], above a pool in a dry wadi of small tributary of the Euphrates, 19 May 2001: net. 4 ma; – Halabiyyeh [3], ruins of ancient fortress town, October 1995: 1 ind. from *Tyto alba* pellet; 17 June 1998: 3 inds. from *Tyto alba* pellets; 15 April 2001: 13 inds. from *Tyto alba* pellets; – Qala'at ar Rahba [4], castle ruins, 21 April 2001: 10 inds. from *Tyto alba* pellets; 17 May 2001: 1 ma found in a wall fissure; – Zalabiyyeh [5], rocks under ancient ruins, 15 April 2001: 4 inds. from *Tyto alba* pellets. – Dimashq: Jeiroud [6], April–June 1908: 1 ma (one of the MNHN specimens identified as *M. myotis* by Trouessart & Kollman 1923). – Hassake: Khazneh [7], Jebel 'Abd al 'Aziz, cave, 17 May 2001: net. 2 ma, 1 fa. – Homs: Tadmor [8], 'Palmyra Dam', 20 May 2001: obs. and det. min. 3 flying inds. – Raqqa: Al Ghazli [9], wadi 2 km S, 11 May 2001: coll. 1 ms; – Raqqa [10], 8–9th century Islamic settlement at mouth of the Al' Balikh river to the Euphrates, 5 inds. (mandible fragments); – Rasafah [11], ancient ruins, 16 June 1998: obs. nurs. colony of min. 7 ad. inds. + 4 juv. (coll. 4 faL, 2 fj, 2 mj), net. 1 ma; 16 June 1998: 4 inds. from *Tyto alba* pellets; 27 June 1998: 3 inds. from *Tyto alba* pellets; 14 April 2001: 1 ind. from fresh *Tyto alba* pellets, 6 inds. from *Tyto alba* pellets in a cistern; 13 May 2001: obs. a colony of min. 6 ad. inds. (coll. 1 ma); 9 October 2004: in ruins obs. 4 inds., net. 6 ma, 4 fa (coll. 1 fa). – **Published data**: Deir ez Zur: Qala'at ar Rahba [4], 17 May 1989: 1 ind. from *Tyto alba* pellet (Shehab et al. 2004). – Halab: Halab [12] (?), 'Aleppo Bazaar' (Russel 1794, cf. Shehab et al. 2004). – Homs: Qaryateine, Qariateine (= Al Qaryatein) [13], 1 ind., BZM (Harrison 1972, Kumerloeve 1975b, Atallah 1977); Karyatein (= Al Qaryatein), 1 m, 2 f, HUJ (Qumsiyeh 1985, 1996).

Possible record (Syria *sensu lato*). **Published data**: Syrian Desert, 1 m (Harrison 1964a, Kitchener & Caputi 1985).

Distribution. **General**. *Otonycteris hemprichii* is a Saharo-Sindian species which inhabits arid areas of North Africa, the Middle East and Central Asia (Nader & Kock 1983c, Horáček 1991, Gharaibeh & Qumsiyeh 1995, Horáček et al. 2000). In Africa, it occurs in Saharan countries from Morocco and Niger to Egypt and Sudan (Hayman & Hill 1971, Horáček 1991); the Asian range comprises the Middle East up to southern Turkey and almost entire Iran, and of Central Asia, Afghanistan and Kashmir (Nader & Kock 1983c, Horáček et al. 2000, Bates & Harrison 1997).

Near East. Although it is rarely found, *O. hemprichii* is widespread over the deserts and arid steppes of the Near East (Nader & Kock 1983c, Harrison & Bates 1991, Seddon et al. 1997). From the desert habitats of Arabia it reaches Mesopotamia from Iraq to Turkey and the Rift countries up to central Palestine and Jordan. In Lebanon and Cyprus, this species has never been found.

The only Turkish record of *O. hemprichii* has been reported from Birecik in the Euphrates Valley (Kumerloeve 1975a), it represents the northwestern margin of its distribution range in the Middle East. In Iran, this species occurs throughout the country, but exclusively in the arid regions (Ognev 1928, Farhang-Azad 1969, DeBlase 1980, our unpubl. data).

O. hemprichii is relatively abundant in southern regions of Palestine, from Judea to the central Negev and the northern Arava Valley (Bodenheimer 1935, 1958, Harrison 1964a, Atallah 1977, Qumsiyeh 1985, Yom-Tov et al. 1992a, Mendelssohn & Yom-Tov 1999, Korine & Pinshow 2004). At least seven findings of this bat were made mostly in the southwestern parts of Jordan adjacent to the Wadi Araba and the Dead Sea, but also in the Azraq Oasis (Atallah 1966, 1967, Bates & Harrison 1989, Qumsiyeh et al. 1992, 1998, Al-Omari et al. 2000, Amr 2000). Only few records are available from Sinai (Wassif 1953, our unpubl. data).

Only a few of reports of *O. hemprichii* come from Iraq, the findings are available from Fao (Anderson 1902), Chemchemal-Jarmo Valley, and from Kirkuk Liwa (Nader & Kock 1983c); a record of the Holocene age is available from Uruq (Nader & Kock 1983c).

Syria (Fig. 145). *O. hemprichii* is a medium-frequent bat in Syria and in arid regions it is a rather common species; 12–14 records are known from the whole country (Table 1). The records come entirely from the zone of the arid Mesopotamian steppes and semi-deserts. The only record which possibly comes from the zone of Mediterranean steppe-maquis (*sensu* Zohary 1973) is an uncertain record from the 'Aleppo Bazar' (Russell 1794, but see below). The arid regions of southern and central Syria represent the northern margin of the area regularly inhabited by *O. hemprichii*, although the known distribution in surrounding countries could suggest a different view. In the close desert areas, mainly of Iraq, this bat has never been found and the numerous records in Syria should appear as a spot of higher abundance in this comparison. However, the use of netting and ultrasonic detectors will certainly prove this bat a common inhabitant of deserts in the neighbouring countries, similarly as it is demonstrated for Syria.

The oldest possible record of *O. hemprichii* in Syria is that from the 'Aleppo Bazaar' (Russell 1794, Shehab et al. 2004; see also under *M. myotis*). However, it is extremely uncertain both in the identity and geographic origin of the respective specimens. Russell (1794) observed two varieties of '*Vespertilio murinus*' in Aleppo Bazaar before 1754, one of which being: "rarely observed, they are white and have ears longer than those of the former". Thus, this observation could perhaps represent the specimens of *O. hemprichii*, as bats of the genus *Plecotus* can be eliminated due the white colour (Shehab et al. 2004). Anyway, dried bats are still available in present-time oriental markets as a popular medicine, but their accurate origin can be very wide and unclear, therefore the actual origin of the Russell's (1794) bats remains unknown.

Another old record of *O. hemprichii* might possibly originate in the present-day Syria; it is the BMNH male specimen No. 14.8.17.1. labelled 'Syrian Desert' (Harrison 1964a). However, the most probable country of origin of this bat is Iraq or Jordan, the former British mandate territories which cover parts of the Syrian Desert, where the older BMNH collections are likely to came from. Trouessart & Kollman (1923) published a record of two specimens of '*Myotis myotis*' in Djéroud

(= Jeiroud). One of these MNHN bats collected in 1908 has been identified as *O. hemprichii*, thus it represents the first undisputable record of this species from the present-day Syria.

FIELD NOTES. Roosts of colonies of *Otonycteris hemprichii* were repeatedly discovered in the deserted town of Rasafah (Figs. 94–97). In the western wall of the ruins, in a fissure between ceiling stones a colony was found on 16 June 1998 and on 13 May 2001. During both these visits and also on 8 October 2004, single individuals were observed in similar fissures. Another solitary male was found to roost in a crack of a dry muddy wall of a small side wadi of the Al' Balikh valley at Al Ghazli (Figs. 80, 146). Another bat was accidentaly detected by the presence of faeces under a crack in a muddy side of the castle hill of Qala'at ar Rahba.

At several places, *O. hemprichii* was recorded in Syria also by netting. One individual was caught at the opening of a cistern in the centre of the ruins of Rasafah on 16 June 1998 and 10 bats also on 8 October 2004. Three individuals were captured at the entrances of two small caves above the village of Khazneh in the Jebel 'Abd al 'Aziz Mts. Over a small pool of rest water in a wadi of a small tributary of the Euphrates at Ayyash, four bats were netted.

In the ruins where *O. hemprichii* was found to roost, the following species were also revealed: *T. nudiventris*, *E. bottae* and *P. kuhlii* (Rasafah) and *T. nudiventris*, *A. tridens* and *P. kuhlii* (Qala'at ar Rahba). At Al Ghazli, *M. capaccinii* was netted close to the roost of the single *O. hemprichii* individual. During the netting sessions when *O. hemprichii* was caught, also *T. nudiventris*, *E. bottae* and *P. kuhlii* (at Khazneh) and *T. nudiventris* and *P. kuhlii* (at Ayyash) were captured.

The examined part of the small colony of *O. hemprichii* found in Rasafah on 16 June 1998 was composed of four lactating females and four hairless nonvolant juveniles with LAt varying from 31.6 to 37 mm (mean 34.08 mm; = 54.4–63.7% of the mean from adults, see Table 31). The colony composed of at least six adults discovered in Rasafah on 13 May 2001 was not examined. Atallah

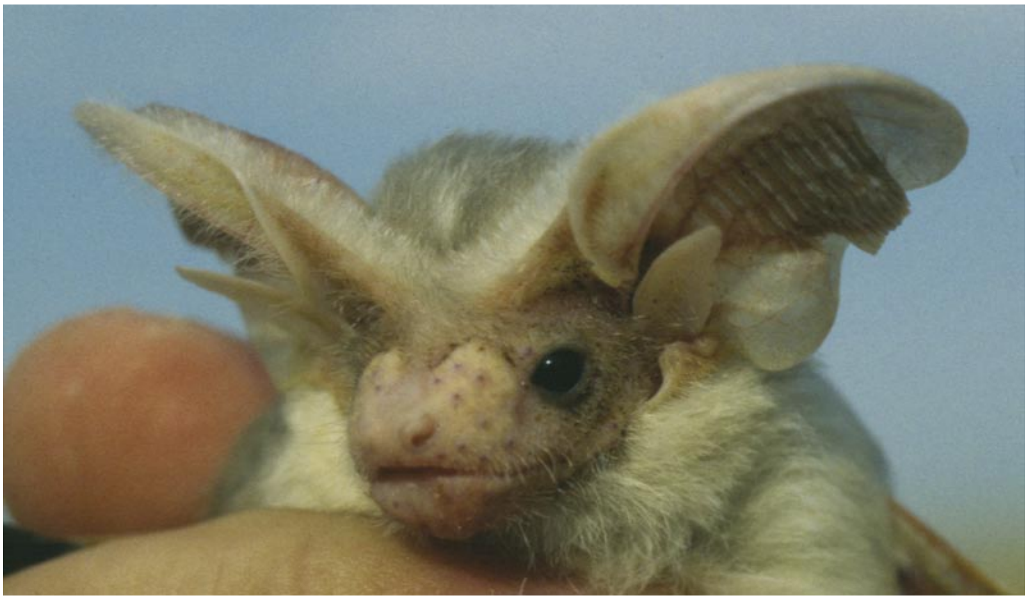


Fig. 146. Portrait of *Otonycteris hemprichii* Peters, 1859 from Al Ghazli (photo by A. Reiter).

(1967) found a colony in Jordan on 2 May 1966, from which three examined pregnant females carried two embryos each. Mendelssohn & Yom-Tov (1999) reported on a female at the end of lactation netted on 4 July in the Negev Desert, and Fenton et al. (1999) captured post-lactating females there on 19 June. Atallah (1967, 1977) estimated the period of births at early June.

O. hemprichii was found in the diet of *Tyto alba* (Shehab et al. 2004, our data), but it was not detected in the diet of other owls in Syria. It was identified in 13 samples from five sites, 10 of them were analysed completely (Table 35). After *P. kuhlii*, *O. hemprichii* is the second most frequently found bat species in owl diet in Syria. Its remains represented 0.05–3.32% (mean 0.68%) per sample volume of all prey items of the barn owl diet from Syria (and 0.06–3.52% [mean 0.76%] of mammalian and 0.64–100% [18.25%] of bat items). In the Middle East, remains of *O. hemprichii* were found also in the diet of *Strix butleri* in Palestine and of *Tyto alba* and *Bubo bubo* in Iran (Obuch unpubl.).

Material examined. 1 ms (NMP 48767 [S+A]), Al Ghazli, 11 May 2001, leg. A. Reiter; – 7 inds. (NMP 90390; 7 skulls, 6 right mandibles, 6 left mandibles, from owl pellets), As Salihiyyah, 19 April 2001, leg. J. Obuch; – 4 ma (NMP 48827–48830 [S+A]), Ayyash, 19 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma (MNHN 1983-1485 [A]), Djéroud (= Jeiroud), 1908, leg. H. Gadeau de Kerville; – 1 fa (ZMB 42373 [S+A]), El Karyatein (= Al Qaryatein), leg. B. Aharoni; – 3 inds. (NMP 90391; fragments of 1 rostrum, 1 left mandible, 3 right madibles, from owl pellets), Halabiyyeh, 17 June 1998, leg. J. Obuch; – 13 inds. (NMP 90392; 10 skulls, 1 pair of maxillae, 11 left mandibles, 13 right mandibles, from owl pellets), Halabiyyeh, 15 April 2001, leg. J. Obuch; – 2 ma, 1 fa (NMP 48815–48817 [S+A]), Khazneh, Jebel 'Abd al 'Aziz, 17 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 2 inds. (SMF 74083; 2 right mandibles, from owl pellet), Qala'at ar Rahba, 17 May 1989, leg. D. Kock; – 10 inds. (NMP 90393; 3 skulls, 3 rostra, 3 right maxillae, 2 left maxillae, 10 left mandibles, 10 right mandibles, from owl pellets), Qala'at ar Rahba, 21 April 2001, leg. J. Obuch; – 1 ma (NMP 48812 [S+A]), Qala'at ar Rahba, 17 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 4–5 inds. (SMF 90489–90493; 2 left and 3 right mandibles), Raqqa, ded. C. Becker; – 2 ma, 2 mj, 4 fa, 2 fj (NMP 48007–48010, 48014, 48783 [S+A], 48006, 48011–48013 [A]), Rasafah, 16 June 1998, 13 May 2001, leg. M. Andreas, P. Benda, A. Reiter, M. Uhrin & D. Weinfurtová; – 4 inds. (NMP 90394; 2 rostra, 1 pair of maxillae, 4 left mandibles, 3 right mandibles, from owl pellets), Rasafah, 16 June 1998, leg. J. Obuch; – 5 inds. (ISEA M/11756–11766, M/11789–11791; 1 skull, 2 left mandibles, 3 right mandibles, 2 left maxillae, 2 right maxillae, 4 cochleae, from owl pellets), Rasafah, 27 June 1998, leg. A. Shehab; – 6 inds. (NMP 90395; 4 skulls, 2 rostra, 6 left mandibles, 5 right mandibles, from owl pellets), Rasafah, 14 April 2001, leg. J. Obuch; – 1 f (NMP 90283 [S+A]), Rasafah, 9 October 2004, leg. R. Lučan; – 4 inds. (NMP 90396; 4 skulls, 4 pairs of mandibles, from owl pellets), Zalabiyyeh, 15 April 2001, leg. J. Obuch.

Morphology. See Table 31 and Appendix III for biometric data on the Syrian specimens of *Otonycteris hemprichii*. The baculum extracted from a specimen of *O. hemprichii* from Syria is shown in Fig. 53. For comments on this preparation see Taxonomy.

Taxonomy. *Otonycteris hemprichii* is most often considered a polytypic species, up to five subspecies are recognised (Ellerman & Morrison-Scott 1951, Kock 1969, Corbet 1978, Koopman 1994, Gharaibeh & Qumsiyeh 1995); viz. *O. h. hemprichii* Peters, 1859 (terra typica: primarily unspecified, Ellerman & Morrison-Scott 1951 suggested 'NE Africa', Kock 1969 restricted it to 'Niltal zwischen nördlich von Assuan, Ägypten, bis Chondek, N-Sudan'); *O. h. leucophaea* (Severtzov, 1873) (t.t.: near Džan-Bulak, between Tashkent and Hodžent [= western promontory of Kuraminskij hrebet Mts, Tajikistan; according to Ognev 1927 and Pavlinov & Rossolimo 1987]); *O. h. petersi* Anderson, 1902 (t.t.: Fao, Persian Gulf [Iraq]); *O. h. cinerea* Satunin, 1909 (t.t.: Satunin 1909 mentioned 'Nukendžag, Ge county, Persian Beluchestan'; but Ognev 1928 changed to 'Zirkuh county, near Bamrud, Khorasan' [= Zarakkuh county, near Bamrud, Khorassan, Iran; see Etemad 1969; accepted by Etemad 1969, DeBlase 1980, Baranova et al. 1981 and Gharaibeh & Qumsiyeh 1995); and *O. h. jin* Cheesman et Hinton, 1924 (t.t.: Hufuf, Hasa, [E Saudi] Arabia). On the other hand, Horáček (1991) and Horáček et al. (2000) concluded that the geographic variation in *O. hemprichii* is rather clinal and therefore, local populations cannot be considered separate

Table 31. Basic biometric data on examined Syrian and comparative samples of *Otonycteris hemprichii* Peters, 1859. For abbreviations see pp. 10, 11

			Syria					Egypt (incl. Sinai)			Turkey
	n	**M**	min	max	SD	n	**M**	min	max	SD	
LAt	18	**58.06**	55.1	61.7	1.991	4	**60.48**	58.5	62.6	1.684	58.3
LCr	17	**22.15**	21.07	23.22	0.545	11	**22.53**	21.58	23.59	0.548	22.62
LCb	17	**21.11**	20.16	22.43	0.593	10	**21.27**	20.43	21.94	0.449	21.27
LaZ	17	**14.50**	13.96	15.38	0.384	11	**13.91**	12.95	15.04	0.641	14.15
LaI	17	**4.35**	4.17	4.55	0.119	11	**4.07**	3.82	4.34	0.171	4.52
LaN	17	**10.26**	9.92	10.74	0.234	11	**9.98**	9.27	10.56	0.368	9.97
ANc	16	**7.26**	6.75	7.91	0.281	11	**7.13**	6.66	7.47	0.250	7.02
LBT	17	**5.77**	5.42	6.11	0.175	7	**5.72**	5.62	5.88	0.105	5.68
CC	17	**6.13**	5.75	6.62	0.242	11	**5.83**	5.33	6.34	0.294	5.87
M^3M^3	17	**9.59**	9.17	10.44	0.319	10	**9.44**	8.87	9.74	0.259	9.08
CM^3	17	**8.08**	7.72	8.59	0.233	11	**8.30**	8.03	8.49	0.131	7.82
LMd	22	**15.77**	14.95	16.52	0.438	10	**15.99**	15.47	16.57	0.332	16.07
ACo	20	**6.86**	6.27	7.45	0.326	10	**6.96**	6.52	7.23	0.209	6.73
CM_3	16	**9.04**	8.74	9.55	0.237	11	**9.15**	8.98	9.31	0.123	8.71
			Maghreb					Iran			Saudi Arabia
	n	**M**	min	max	SD	n	**M**	min	max	SD	
LAt	11	**61.72**	58.5	66.6	2.235	10	**65.34**	63.5	67.1	1.333	–
LCr	14	**22.57**	21.85	23.19	0.487	11	**23.41**	22.16	24.55	0.701	23.18
LCb	14	**21.21**	20.34	22.01	0.557	11	**22.11**	21.36	22.97	0.523	21.85
LaZ	14	**14.26**	13.67	14.74	0.366	11	**14.68**	14.15	15.17	0.306	14.32
LaI	14	**4.13**	3.97	4.32	0.102	11	**4.14**	3.78	4.57	0.225	3.88
LaN	12	**10.20**	9.88	10.45	0.189	11	**9.91**	9.32	10.42	0.324	10.20
ANc	14	**7.13**	6.76	7.68	0.284	9	**7.57**	7.33	7.86	0.169	7.18
LBT	10	**5.84**	5.67	6.06	0.119	9	**5.80**	5.50	6.28	0.244	5.60
CC	14	**5.92**	5.64	6.30	0.191	9	**6.11**	5.68	6.62	0.326	5.76
M^3M^3	14	**9.51**	9.08	10.02	0.216	8	**9.73**	9.39	10.07	0.256	9.83
CM^3	14	**8.13**	7.76	8.41	0.177	11	**8.39**	8.15	8.82	0.191	8.33
LMd	14	**15.98**	15.21	16.62	0.449	9	**16.56**	16.10	17.08	0.352	16.23
ACo	14	**7.11**	6.62	7.64	0.309	9	**7.47**	6.90	7.83	0.272	7.42
CM_3	14	**9.01**	8.73	9.25	0.163	9	**9.46**	8.92	9.69	0.236	–

subspecies (see also Simmons 2005). However, any representative analysis of the geographical variation within the whole species range of *O. hemprichii* has not been performed yet (Gharaibeh & Qumsiyeh 1995).

The populations of *O. hemprichii* from the Middle East have been assigned to three or four forms. Anderson (1902) described a new species, *O. petersi*, from Lower Mesopotamia and this form was regarded as a separate species by subsequent authors (Kinnear 1916, Bianki 1917, Cheesman & Hinton 1924), although Bianki (1917) rather doubted the existence of more than one species in the genus *Otonycteris*. (However, most Russian authors [Bobrinskoy 1925, Ognev 1928, Kuzjakin 1950, 1965, Strelkov 1963, Strelkov et al. 1978] regarded the Persian form, *O. cinerea* specifically separated from Central Asian populations which they assigned to *O. hemprichii*.) Anderson (1902) reported his *O. petersi* to be smaller than *O. hemprichii*, with shorter ears and tragi. Cheesman & Hinton (1924) described another species from eastern Arabia, *O. jin*, on the basis of its larger and denser fur, paler colour, and more inflated auditory bullae.

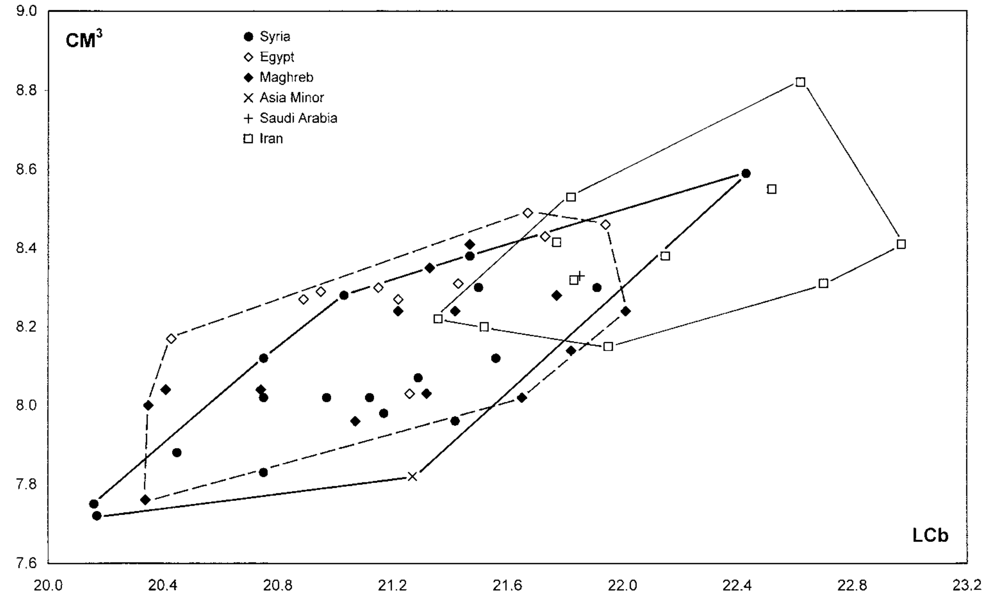


Fig. 147. Bivariate plot of examined Syrian and comparative samples of *Otonycteris hemprichii* Peters, 1859: condylobasal length of skull (LCb) against the length of upper tooth-row (CM^3). Explanation: bold-lined polygon = Mesopotamian samples (n=18); thin-lined polygon = Persian samples (n=11); dashed polygon = African samples (n=25).

Ellerman & Morrison-Scott (1951) integrated with question all described forms of *Otonycteris* into single species, *O. hemprichii*, containing three subspecies (*hemprichii*, *cinerea*, *jin*). Harrison (1956c) mentioned two forms of one species *O. hemprichii* to occur in Arabia, smaller and darker *O. h. hemprichii* (LAt 57–61 mm) and larger and paler *O. h. jin* (LAt 64–66 mm). Probably on this basis, Bodenheimer (1958) reported *O. h. hemprichii* from Palestine. However, Harrison (1964a) regarded most populations from Arabia, including those of Palestine and Sinai, to belong to *O. h. jin*, while the northernmost respective populations (Syrian Desert, Iraq) to *O. h. petersi*, which he found to be "certainly smaller than *jin* and has ears distinctly smaller than that form and somewhat smaller than the typical race".

Qumsiyeh (1985) determined all Egyptian specimens examined by him to belong to the nominotypical subspecies, but he concluded that Sinai individuals (reported by Wassif 1953) might be *O. h. jin*, a larger form which occurs in Arabia and Palestine. Harrison & Bates (1991) reported a similar subspecific division of *O. hemprichii* as Harrison (1964a); they referred populations of western, central and southern Arabia to *O. h. jin* (on account of their pale colour and average large size; LAt 60.3–69.8 mm; LCr 23.4–26.9 mm) and specimens from Iraq and the Syrian Desert to *O. h. petersi* (comparatively smaller; LAt 57–60.7 mm; LCr 21.9–23.2 mm).

On the other hand, Kock (1969) considered the form *petersi* to be synonymous with *hemprichii*, and for the definition of *jin* he did not find sufficient substantiation. Therefore, he did not detect existence of any subspecies within the whole rank of *O. hemprichii*. Although Corbet (1978) listed five valid subspecies in the species range (*hemprichii*, *jin*, *petersi*, *leucophaeus*, *cinerea*), he noted that "it seems likely that variation will prove to be continuous throughout the range". According to Nader & Kock (1983c), coloration seems inadequate for a subspecies definition and there is not an indication that any subspecies could be defined within the rank of *O. hemprichii*. Horáček (1991) carried out only a partial analysis of geographical variation in *O. hemprichii*; however, he found evidence of cline variations, (1) in metrical characters: from Arabia where the mean dimensions were largest to both northwest (smallest in Maghreb) and northeast (also smaller in Central Asia); and (2) in pelage coloration (from east to west): the Central Asian specimens were often greyish brown while the Maghrebian specimens were extremely pale; moreover, he did not find the differences among local populations to be sharp enough to justify their separation into different subspecies. Similarly, Horáček et al. (2000) pointed out that "geographic variation in size and pelage coloration is rather clinal than categorial what does not support the idea to distinguish local populations as separate subspecies".

To summarise, the following alternative opinions on the geographic variation of *O. hemprichii* are available: (1) the species is more or less invariable and the differences observed among individual populations are clinal (Kock 1969, Horáček 1991, cf. Corbet 1978); or (2) the species is distinctly variable and creates up to five subspecies (Harrison 1956c, 1964a, Harrison & Bates 1991, Koopman 1994, Gharaibeh & Qumsiyeh 1995) and/or represents a complex of more species (Cheesman & Hinton 1924, Kuzjakin 1950, etc.).

The taxonomic position of Syrian populations has not been evaluated yet. If we tentatively accept the concept of categorial variation within *O. hemprichii*, two subspecies can be taken into consideration on the basis of their geographic proximity. A smaller form, *O. h. petersi* (sometimes called also *O. h. hemprichii*, see above), which inhabits Lower Mesopotamia (Anderson 1902, Kinnear 1916, Harrison 1956c, 1964a, Harrison & Bates 1991), and a larger form, *O. h. jin*, which has been reported to occur in Palestine and Jordan (Harrison 1964a, Atallah 1967, 1977, Bates & Harrison 1989, Harrison & Bates 1991, Qumsiyeh et al. 1992, Qumsiyeh 1996, Mendelssohn & Yom-Tov 1999, Ferguson 2002, etc.) and elsewhere in southern and eastern Arabia (Harrison 1964a, Nader 1990, Harrison & Bates 1991).

Although *Otonycteris* specimens are rather scarce in collections (cf. Gharaibeh & Qumsiyeh 1995), we performed a simple analysis of a set of ca. 50 individuals from North Africa and the Middle East (unfortunately, the individuals from Palestine and Arabia were not available). According to the simple comparison of skull dimensions (Table 31, Figs. 147, 148), the examined individuals created two basic groups: (1) specimens with a rather small skull, relatively longer rostrum and a relatively broader braincase originated in Syria, Turkey, Sinai, Egypt and Maghreb, and (2) specimens with a larger skull but with relatively shorter rostrum and a relatively narrower braincase coming from Iran.

The existence of these clear morphotypes seems to confirm the categorial variation and rather verify the hypothesis of distinct variation within the species rank (contra Horáček 1991). It suggests that there are two subspecies present in the Middle East; *O. h. hemprichii* lives in Syria and Sinai (also in North Africa from Egypt to Morocco), while the other form, called tentatively *O. h. cinerea* due to geographical reasons, is found in Iran. We did not examine the type specimens of descriptions located in the eastern part of the distribution range (*Plecotus leucophaeus* Severtzov, 1873, *Otonycteris cinereus* Satunin, 1909, and *O. jin* Cheesman et Hinton, 1924) nor analyse most of the eastern populations, both from Arabia and Central Asia, but Satunin's (1909) description comes from the nearest locality to the compared Persian samples (Ognev 1928), see Appendix II. The only examined individual from Saudi Arabia (coming from ca. 100 km NE of Riyadh) showed an intermediate position between the two morphotypes (Figs. 147, 148), therefore the suggested existence of another morphotype in central and southern Arabia (see Harrison & Bates 1991) could not be confirmed or rejected.

Besides other characters, short ears were reported by Anderson (1902) and Harrison (1964a) to be typical for the form *petersi* from Iraq and the Syrian Desert. When we compare forearm

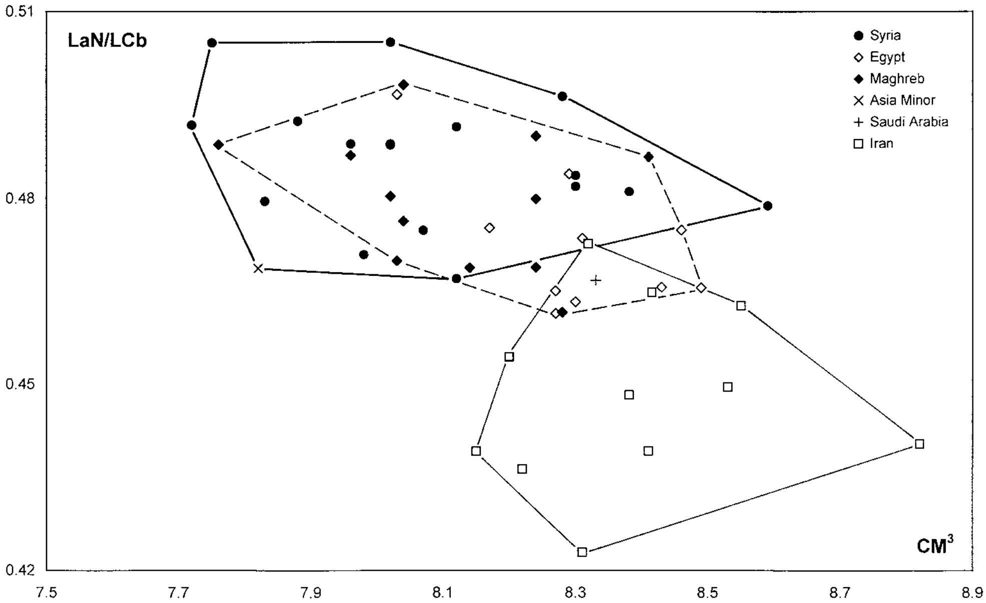


Fig. 148. Bivariate plot of examined Syrian and comparative samples of *Otonycteris hemprichii* Peters, 1859: relative width of neurocranium (LaN/LCb) against the length of upper tooth-row (CM^3). For explanation see Fig. 147.

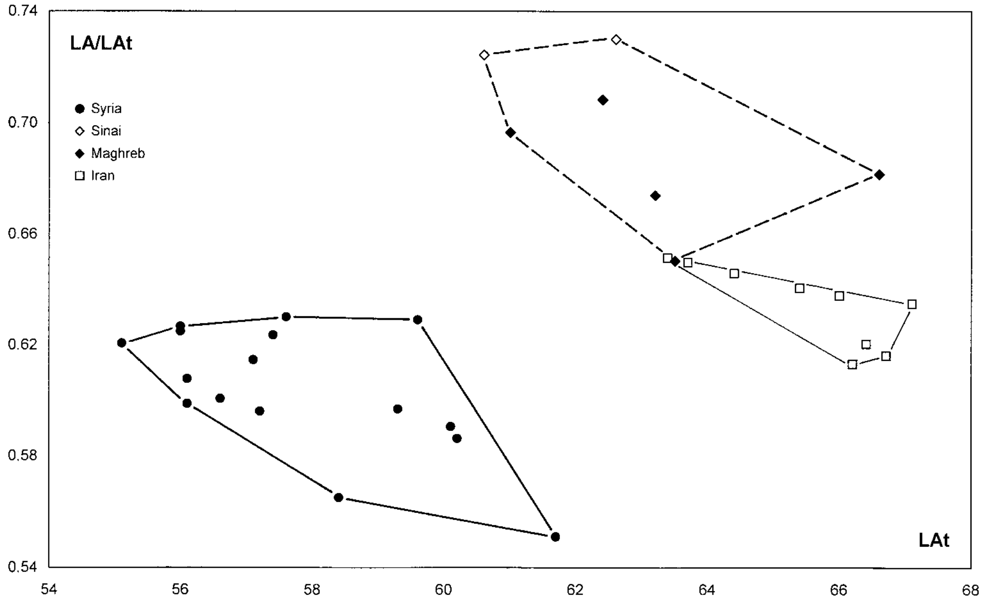


Fig. 149. Bivariate plot of examined Syrian and comparative samples of *Otonycteris hemprichii* Peters, 1859: forearm length (LAt) against the relative length of auricle (LA/LAt). For explanation see Fig. 147.

length and the relative ear length in all individuals examined as fresh specimens (by one of us, PB), the Syrian samples have absolutely shortest forearms and relatively very short ears, similarly as the Persian samples, which, however, have much longer forearms (Fig. 149). This comparison also showed close relations of Egyptian (Sinaitic) samples and those from the Maghreb, which, similarly as the comparison of skull dimensions, confirmed their affiliation to the only form, *O. h. hemprichii* (Sanborn & Hoogstraal 1955, Hayman & Hill 1971, Gaisler et al. 1972, Qumsiyeh 1985, Kowalski & Rzebik-Kowalska 1991, etc.). However, since we did not examine any Palestinian specimens and since the samples of African bats are rather scarce, we cannot eliminate a possible cline shift of forearm and ear lengths from Sinai to Syria via the Levant. Thus, the possibility of existence of a separate Mesopotamian form, *O. h. petersi* remains open, being tentatively supported by the examination of external dimensions but really unsupported by skull measurements. The other possible subspecies, *O. h. jin* or populations assigned to it (coming from most of Arabia), have a key role in the understanding of morphotypical transition between African and Syrian populations and also between African and Persian ones.

The examined baculum of a Syrian individual of *O. hemprichii* (Fig. 53) was very similar (simple, dorso-ventrally flattened, crescent-shaped stick) to the ones described from other Afro-Arabian individuals by Fairon (1980) (Sahara) and Hill & Harrison (1987) and Bates & Harrison (1997) (Saudi Arabia). That depicted by Wassif & Madkour (1972) from Egypt slightly differs in the formation of its proximal epiphysis, being much broader.

FEEDING ECOLOGY. *Otonycteris hemprichii* is a large bat reported to fly in two different ways – very close to the ground above rocks or at the height of some 4–8 meters. It has been observed to catch flying insects as an obligatory echolocator and to glean passively listened prey from the ground (Horáček 1991). According to previous studies in different parts of the Middle East and Central Asia, the most important prey categories seem to include Tenebrionidae, Blattodea and Orthoptera

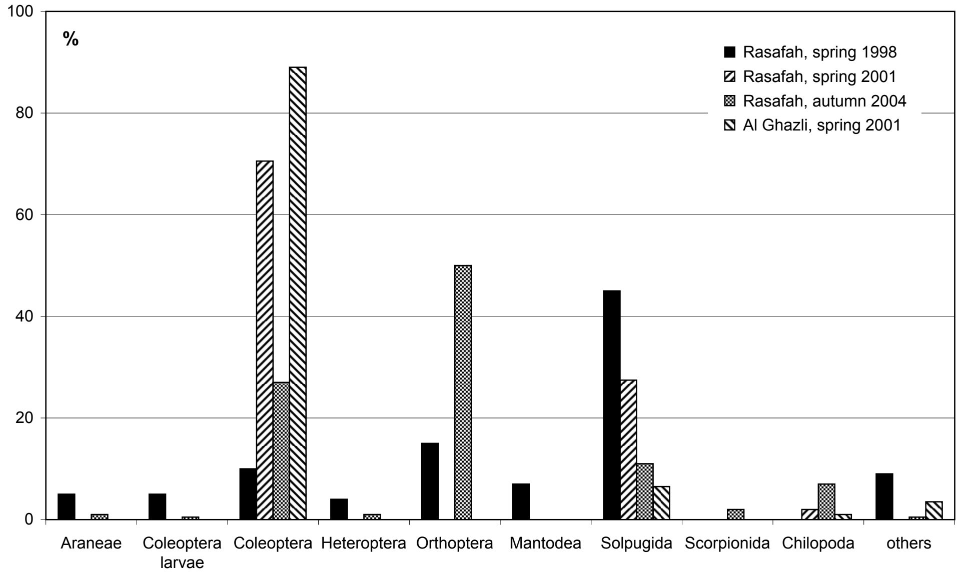


Fig. 150. Volume of particular food items in the diet of *Otonycteris hemprichii* Peters, 1859 from Syria.

(Horáček 1991), Scarabaeidae (Whitaker et al. 1994), Scorpionida, Solpugida and Orthoptera (Arlettaz et al. 1995), Coleoptera, Heteroptera and Hymenoptera (Fenton et al. 1999), Solpugida and Scorpionida (Benda et al. 1999b).

Coleoptera, Solpugida and Orthoptera were the most abundant items in the analysed faeces samples of *O. hemprichii* from Syria (Fig. 150). Regarding particular Coleoptera families consumed, Scarabaeidae (69% of volume), Carabidae (16%) and Tenebrionidae (15%) were the most frequently consumed beetles. At one site (Rasafah), the diet was sampled three times and important differences indicating certain flexibility in the feeding ecology of the species were found. The preyed arthropods undoubtedly picked up from the ground (Solpugida, Scorpionida, Coleoptera larvae and Chilopoda) represented a significantly large part of the diet composition. Contents of digestive tracts of four specimens collected at Ayyash were also studied. One was empty, one contained only Formicoidea, one contained only Scarabaeidae and the last one contained approximately equal proportions of Blattodea and Mantodea. The digestive tract from one individual collected at Qala'at ar Rahba contained 60% of volume of Carabidae and 40% of Solpugida. Three digestive tracts from Khazneh contained Coleoptera larvae and Mantodea.

Our results prove an important role of ground gleaning in the foraging behaviour of *O. hemprichii* and certain seasonal and regional variation in the diet.

Plecotus macrobullaris Kuzjakin, 1965

Records. **Original data**: Dimashq: Maalula [1], cave, 30 April 2001: net. 1 ma, 2 fa, 3 faG (cf. Benda et al. 2004c); – Ras al Ain [2], small cave in an escarpment, 22 May 2001: net. 2ma, 3 faG (cf. Benda et al. 2004c); – Yabroud [3], cave in an escarpment above the town, 26 June 1998: net. 2 faL (cf. Benda et al. 2004c, Juste et al. 2004); above an escarpment, 5 October 2004: net. 2 ma, 1 fa. – **Published data**: Dimashq: Djéroud (= Jeiroud), NE de Damas (= Dimashq) [4], April–June 1908: 1 ind. (Trouessart & Kollmann 1923; as *P. auritus*, but see Benda et al. 2004c). – Quneitra / Golan Heights: Mount Hermon [5], 11 September 1994: 1 ma, 19 June 1995: 1 faL (Mendelssohn & Yom-Tov 1999; as *P. austriacus*, but see below).

Possible record (Syria *sensu lato*). **Published data**: Syria (Tristram 1884; as *P. auritus*); – Syria, 1 ind. (Spitzenberger et al. 2006).

Distribution. **General**. *Plecotus macrobullaris* is a bat only recently defined at the species level in a slightly complicated taxonomic course (for details see Kiefer & von Helversen 2004a) and its distribution range is probably only partially known.

According to the available data, *P. macrobullaris* occurs in mountains of southern Europe, the Caucasus Region and the Near East. Its European range comprises all the main mountain ranges in the south of the continent, including the Pyrenees, Alps, Dinaric Alps, and the Pindos Mts (Spitzenberger et al. 2001, 2002, 2003, 2006, Kiefer & Veith 2002, Kiefer et al. 2002, Garin et al. 2003, Benda et al. 2004c, Juste et al. 2004, Kiefer & von Helversen 2004a, Pavlinić & Tvrtković 2004, Tvrtković et al. 2005) and two Mediterranean islands, Corsica and Crete (Juste et al. 2004, Kiefer & von Helversen 2004a).

The Asian part of distribution range of *P. macrobullaris* includes mountainous regions of Turkey, the Caucasus Region from the northern slopes of the Greater Caucasus to Transcaucasia, Syria and western Iran (Spitzenberger et al. 2003, 2006, Benda et al. 2004c, Juste et al. 2004).

Near East. Bats of the genus *Plecotus* have been reported mainly from the Mediterranean parts of the Near East and from southern Palestine and Jordan. Although most of the records were mentioned under species assignment to *P. auritus* (Linnaeus, 1758) or *P. austriacus* (Fischer, 1838) according to the former taxonomic opinion (see Benda & Horáček 1998 and below), only two species were definitely confirmed by modern genetical and/or morphological analyses from that area, *P. macrobullaris* and *P.* '*teneriffae*' *kolombatovici** Đulić, 1980 (Spitzenberger et al. 2003, 2006, Benda et al. 2004c, Juste et al. 2004); a third species, *P. christii* Gray, 1838† is suspected to occur there (Benda et al. 2004c, Kiefer & von Helversen 2004b, cf. Qumsiyeh 1985).

In Turkey, the *Plecotus* bats occur throughout the country (Albayrak 1991b, Benda & Horáček 1998, Karataş et al. 2003c). *P. macrobullaris* has been found in central (near Nevşehir) and eastern Anatolia (Van and near Bitlis) and in the Cilician Taurus Mts (Spitzenberger et al. 2003, 2006, Benda et al. 2004c). Turkey is the only country of the Near East, where *P.* '*t.*' *kolombatovici* has been reported (Spitzenberger et al. 2002, 2006, Benda et al. 2004c, Juste et al. 2004, cf. Nader & Kock 1983c, von Helversen 1989); its records come from the Mediterranean coastal areas between Lycia and Hatay. The *Plecotus* records of uncertain species identity from Hatay (Kahmann & Çağlar 1960, Çağlar 1969) are more probably of *P.* '*t.*' *kolombatovici* than of any other species (Fig. 151; cf. Benda et al. 2004c).

No data are available on the occurrence of the bats of the genus *Plecotus* in Lebanon and Iraq, although Metaxas (1891) reported the occurrence of '*Vespertilio auritus*' in Mesopotamia. However, Hatt (1959) considered this report unsubstantiated. Boye et al. (1990) mentioned the records of *Plecotus* sp. from several sites in Cyprus, however, their species identity according to modern taxonomy remains unknown.

In western Iran, *Plecotus* sp. occurs throughout the Zagros Mts and in the Talysh Mts (Harrison 1963b, Etemad 1967, DeBlase 1980). Benda et al. (2004c) and Juste et al. (2004) reported two new records of *P. macrobullaris* from the Zagros Mts. Spitzenberger et al. (2006) revised most of the Persian specimens of the genus *Plecotus* referred by DeBlase (1980) and they showed them to belong to *P. macrobullaris*. This species is the only confirmed *Plecotus* species in Iran.

In the Rift countries of the Near East, bats of the genus *Plecotus* (mostly under the name *P. austriacus*) have been reported from two ecologically distinct regions. Probably only one record comes from the northern part of Palestine, from the Mediterranean woodland, 'by the Sea of Galilee' (Tristram 1866, Mendelssohn & Yom-Tov 1999). Most records are available from arid and desert habitats of southwestern Jordan (Qumsiyeh et al. 1992, Qumsiyeh 1996, Disi & Ha-

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* NOTE. Benda et al. (2004c) and Spitzenberger et al. (2006) performed combined genetic and morphological analyses of Mediterranean plecotine bats with very similar results but with a slightly different interpretation. The difference is in the taxonomic evaluation of the *kolombatovici* clade of the *austriacus* group (in the sense of Juste et al. 2004). This clade consists of a mosaic of morphotypes with a relatively very shallow genetic divergence. Benda et al. (2004c) coidentified this group with one species, *P. teneriffae*, containing three to four more or less distinct forms living in allopatry (*teneriffae*, *kolombatovici*, *gaisleri*, and a possible fourth form in the Maghreb but preliminarily included into *gaisleri*). Spitzenberger et al. (2006) distinguished two species in the clade, the monotypic *P. teneriffae*, and *P. kolombatovici* with three forms, *kolombatovici*, *gaisleri*, and the unnamed Maghrebian form. A third possible interpretation, considering three species within the clade (which well conform with the morphological evidence) is also possible, but has not yet been suggested. Since both analyses used almost the same types of character sets, their interpretations are two alternatives arising from almost identical results. Thus, until a new evidence is available for evaluation of relations within the clade, we keep the 'intermediate' designation for the members of the clade, *P. teneriffae/kolombatovici* on the species level (considering the clade), and *P.* '*teneriffae*' *kolombatovici* for the populations of the clade inhabiting the Balkans and Asia Minor.

† NOTE. Gray (1838: 495) described the species *Plecotus christii* in honour of Dr Turnbull Christie. Gray (1838) obviously used a Latin form of the name Christie in the description, i.e. Christius, similarly as many other authors did in that period (among bat descriptors e.g. Kuhl, Smith, Fischer, Eversmann, Tomes, Peters, etc.). However, Thomas (1911) introduced usage of the corrected name *christiei*, which was followed by most of subsequent authors (see Benda et al. 2004c: 23). Although Thomas (1911) did not mention any intention to make a justified emendation, the final result of his act is in accordance with Article 33.3.1. of the International Code of Zoological Nomenclature (ICZN 1999) because the name *christiei* has been in prevailing usage and therefore can be considered a 'correct original spelling' (Spitzenberger et al. 2006).

However, we consider the use of the true original spelling (*christii*) more appropriate, similarly as in the case of another Gray's bat name, *Rhinopoma Hardwickii* (see Gray 1831) for which the corrected form *hardwickei* also occurs (being introduced by Thomas 1903). In the combination as a species name, the corrected form *P. christiei* occurs four times (Thomas 1911, Hayman 1948, Harrison 1963b, Spitzenberger et al. 2006) and the original form *P. christii* at least three times (Gray 1838, Benda et al. 2004c, Juste et al. 2004) besides the present paper and one yet unpublished (Benda & Aulagnier in press).

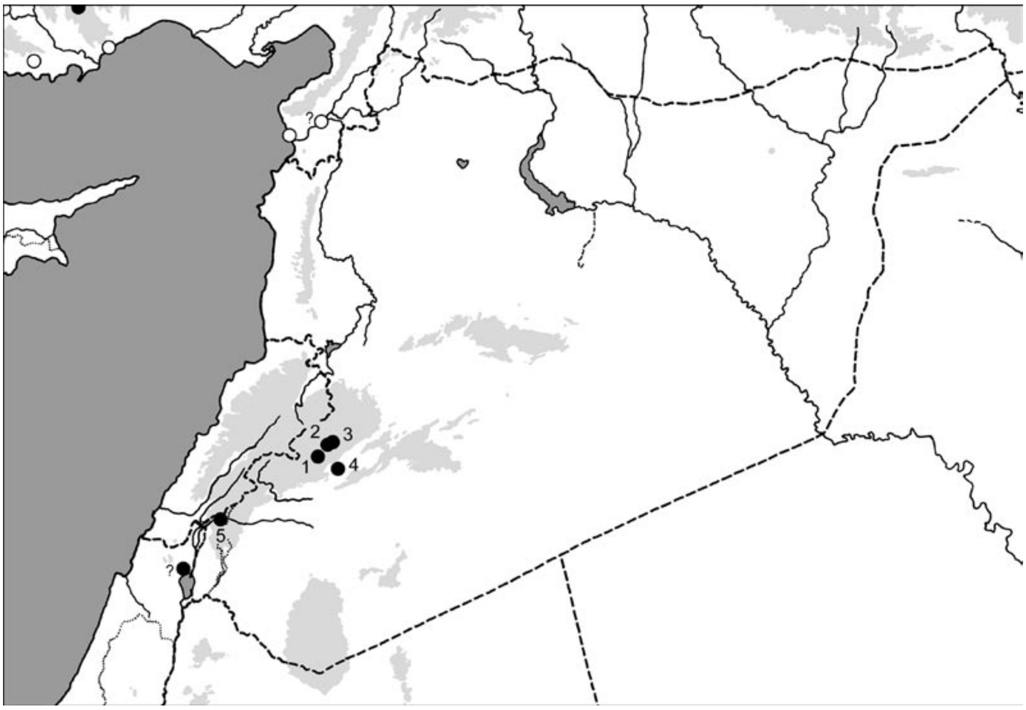

Fig. 151. Records of *Plecotus macrobullaris* Kuzjakin, 1965 (closed symbols) in Syria and surrounding areas. Open symbols denote records of *P.* '*t.*' *kolombatovici* Đulić, 1980 in surrounding regions of Syria.

tough-Bouran 1999) and of central and southern Palestine – Judea, Negev and the Arava Valley (Dobson 1978, Tristram 1884, Harrison 1964a, Makin 1977, 1987, Qumsiyeh 1985, Yom-Tov et al. 1992a, Mendelssohn & Yom-Tov 1999, Korine & Pinshow 2004). Several findings are also available from the southern Sinai (Anderson 1902, Qumsiyeh 1985, our unpubl. data).

The north-Palestine population most probably belongs to *P. macrobullaris*, the only species found in the close mountainous parts of the Levant (see below). However, the desert population of southern Palestine, Jordan and Sinai presumably represents a different species; geographically, the closest desert form is *P. christii* in Egypt (see Benda et al. 2004c, Spitzenberger et al. 2006 and Taxonomy).

In Syria (or possibly in northern Palestine) and in Crete, *P. macrobullaris* reaches southern margins of its presently known distribution range.

Syria (Fig. 151). *P. macrobullaris* is a rare bat in Syria, five to seven records are known from the country (Table 1). Its confirmed findings are available from a restricted area of the eastern slopes of the Anti-Lebanon Mts. All our record sites are situated in this area [1–3] (some of those were preliminary reported by Benda et al. 2004c) and also the bat reported by Trouessart & Kollmann (1923) from Djéroud (= Jeiroud) [4] has such origin. The latter specimen (female) was primarily assigned to *P. auritus* (Trouessart & Kollmann 1923) and later to *P. austriacus* (Harrison 1964a, Kumerloeve 1975b, Harrison & Bates 1991, etc.). However, according to a morphological revision it belongs to *P. macrobullaris* (Benda et al. 2004c). The bats found on Mount Hermon

(Mendelssohn & Yom-Tov 1999) were originally also identified as *P. austriacus*. Although we did not have an opportunity to revise taxonomic identity of these individuals (they were not probably collected), based on their geographical and/or ecological proximity to the above given records, we consider these reports as of *P. macrobullaris*.

P. macrobullaris seems to be a mountainous relic not only in its European range but also in its Asian part of distribution. In the Levant it has been recorded only in the Cilician Taurus Mts (Spitzenberger et al. 2003) and in the Anti-Lebanon Mts incl. Mt. Hermon (Benda et al. 2004c, cf. Mendelssohn & Yom-Tov 1999), the mountainous regions ca. 500 km far from each other (Fig. 151). This distribution pattern suggests an insulated distribution restricted to higher continental areas of the Near East, similarly as in *Myotis aurascens* (see above), but a more profound research in Lebanon and mainly in the mountains of western Syria is needed to confirm this statement. However, the absence of records – even historical – of such conspicuous bats as those of the genus *Plecotus*, rather suggests a relic insulated occurrence than an insufficient knowledge of their Syrian distribution.

FIELD NOTES. *Plecotus macrobullaris* was recorded in Syria solely by netting. Two females were caught at the opening of a large cave/overhang in cliffs above the oasis of Yabroud (together with *H. savii* and *M. nattereri*, and calls of *T. teniotis* were recorded; Fig. 37). Six years later, three individuals were netted at almost the identical site. Six individuals were netted at the entrance to a small cave in the cliff above Maalula (along with *E. serotinus*, *H. savii* and *P. pipistrellus*;

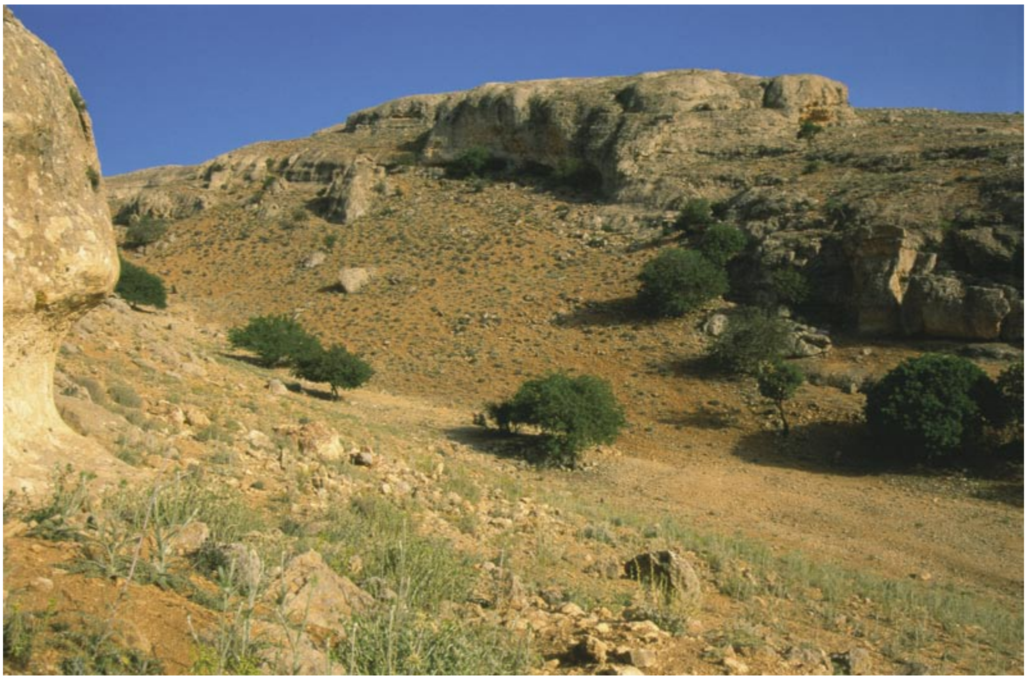

Fig. 152. Cliffs at Ras al Ain, Anti-Lebanon Mts (ca. 1600 m a. s. l.). At a front of the rocky overhangs, five individuals of *Plecotus macrobullaris* were netted (photo by A. Reiter).

Fig. 86). At small caves/overhangs in an escarpment at Ras al Ain, five individuals were captured (Figs. 152, 153).

The sites of occurrence of *P. macrobullaris* in Syria lie at the altitudes from ca. 950 m (Jeiroud) to 1600 m (Ras al Ain), the mean altitude beingh 1304.0 m. This species represents the most apparent mountain element among Syrian bats.

Three pregnant females were netted at Maalula on 30 April 2001, each of them contained one foetus. Their crown-rump varied from 9.3 to 9.9 mm (mean 9.7 mm). Out of the bats collected at Ras al Ain on 22 May 2001, three females were pregnant, each carrying one foetus; their crown-rump length varied from 7.2 to 7.6 mm (mean 7.4 mm). Two lactating females were collected at Yabroud on 26 June 1998. Mendelssohn & Yom-Tov (1999) reported on a catch of a lactating female on Mount Hermon on 19 June 1995. All these data show the possible period of births at about the end of May and early June. Mendelssohn & Yom-Tov (1999) also mentioned finding of a male with large testes on Mount Hermon on 11 September 1994, “probably indicating that mating occurs in autumn”.

Remains of *P. macrobullaris* have not yet been found in the diet of owls.

MATERIAL EXAMINED. 1 fa (MNHN 1983-1996 [S+A]), Djéroud (= Jeiroud), 1908, leg. H. Gadeau de Kerville; – 1 ma, 5 fa (NMP 48989, 48990, 48992–48994 [S+A], 48991 [S+B]), Maalula, 30 April 2001, leg. J. Obuch; – 2 ma, 3 fa (NMP 48849–48853 [S+A]), Ras al Ain, 22 May 2001, leg. P. Benda & M. Andreas; – 2 ma, 3 fa (NMP 48052, 48053, 90280, 90281 [S+A], NMP 90282 [A]), Yabroud, 26 June 1998, 5 October 2004, leg. M. Andreas, P. Benda, R. Lučan & M. Uhrin.

MORPHOLOGY. See Table 32 and Appendix III for the biometric data on Syrian specimens of *Plecotus macrobullaris*. The examined bacula of *P. macrobullaris* from Syria (see Benda et al. 2004c: 16, Fig. 5: 31, 32) generally do not differ from those of other samples from the Middle East (Harrison 1963b, Strelkov 1988a, 1989a).

TAXONOMY. The populations of *Plecotus* bats in the Middle East were primarily assigned to the only recognised species within the genus, *P. auritus* (Linnaeus, 1758) (Trouessart & Kollmann 1923, Ellerman & Morrison-Scott 1951, Harrison 1956c, Bodenheimer 1958, etc.). When the new cryptic diversity in the genus was revealed in the late 1950s (Topál 1958, Lanza 1959b), almost all the southern Palaearctic populations, including the North African and Middle Eastern ones, were more or less arbitrarily classified as a new species, named initially *P. wardi* Thomas, 1911 (Aellen 1959, Lanza 1959b, 1960, Harrison 1963b), later *P. austriacus* (Fischer, 1829) (Bauer 1960, Hanák 1962, 1966, Harrison 1964a, Etemad 1967, Gaisler 1970, Hayman & Hill 1971, Kumerloeve 1975b, Atallah 1977, Corbet 1978, DeBlase 1980, Nader & Kock 1983c, 1990a, Qumsiyeh 1985, 1996, Strelkov 1988b, von Helversen 1989, Albayrak 1991b, Harrison & Bates 1991, Qumsiyeh et al. 1992, 1998, Koopman 1994, Benda & Horáček 1998, Mendelssohn & Yom-Tov 1999, Horáček et al. 2000, Ferguson 2002, Karataş et al. 2003c, etc.). In this concept, populations from the southern part of the Near East, i.e. from Sinai, Palestine, Jordan, and Syria, were referred to *P. austriacus christii* Gray, 1838 (terra typica: North Africa [= Nile Valley between Qena and Aswan, southern Egypt]) (Hanák 1962, Harrison 1964a, Hayman & Hill 1971, Atallah 1977, Qumsiyeh 1985, 1996, Nader & Kock 1990a, Qumsiyeh et al. 1992, 1998, Harrison & Bates 1991, Mendelssohn & Yom-Tov 1999, Ferguson 2002), whereas the populations from the northern regions (Turkey, northern Iran) were mentioned as *P. a. wardi* Thomas, 1911 (t.t.: Leh, Ladak, Kashmir) (Etemad 1967, Strelkov 1981, 1988a, 1989a) or *P. a. macrobullaris* Kuzjakin, 1965 (t.t.: vicinity of Ordžonikidze [= Vladikavkaz], North Caucasus, Russia) (Kuzjakin 1965, Corbet 1978, Koopman 1994).

In the last years, several morphological and genetic studies have revealed a further hidden diversity in *Plecotus* bats and at least six species of this genus are currently recognised in the

Mediterranean region (Kiefer et al. 2002, Mucedda et al. 2002, Spitzenberger et al. 2002, 2003, 2006, Benda et al. 2004c, Juste et al. 2004), viz. *P. auritus*, *P. austriacus* (both in Europe), *P. sardus* (Sardinia), *P. macrobullaris* (mountains of southern Europe and the Middle East), *P. teneriffae/kolombatovici* (southeastern Europe, Asia Minor and Mediterranean Africa), and *P. christii* (northeastern Africa). As noted above, only two species were found certainly in the Near East, *P. macrobullaris* and *P.* '*t.*' *kolombatovici*. The third species, *P. christii*, is suspected to stretch from Africa to Sinai, Palestine and Jordan (see Nader & Kock 1990a for a review). However, no analysis which would evaluate these populations and identify their species status has been carried out so far.

The population of Syria was assigned to *P. austriacus christii* by Harrison (1964a), Atallah (1977), Harrison & Bates (1991), and Ferguson (2002), i.e. *P. christii* according to the current taxonomy (Spitzenberger et al. 2006). The only *Plecotus* record and/or specimen from Syria available to the former authors was the MNHN specimen published by Trouessart & Kollmann

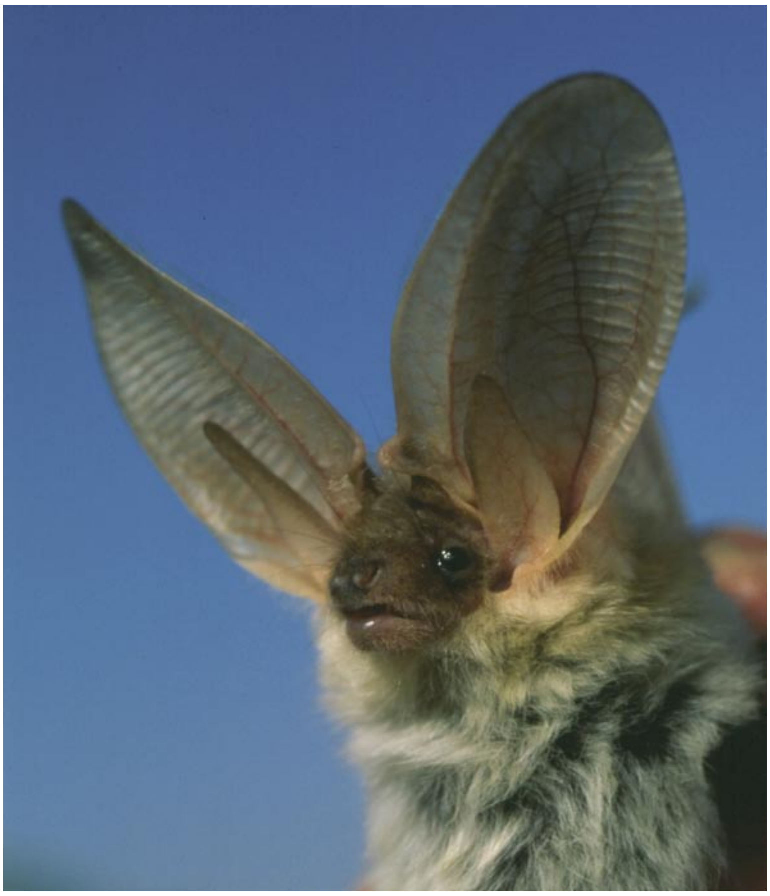

Fig. 153. Portrait of *Plecotus macrobullaris* Kuzjakin, 1965 from Ras al Ain (photo by A. Reiter).

Table 32. Basic biometric data on examined Syrian and comparative samples of *Plecotus macrobullaris* Kuzjakin, 1965, and on other Middle Eastern species of the genus *Plecotus* Geoffroy, 1818. For abbreviations see pp. 10, 11

	P. macrobullaris Syria					*P. macrobullaris* Northern Near East					*P. 't.' kolombatovici* Greece, Turkey & Cyprus				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	17	**42.34**	39.8	44.6	1.347	24	**42.76**	39.8	45.7	1.568	33	**37.98**	36.1	40.7	0.995
LPol	17	**7.11**	6.5	7.6	0.339	16	**7.21**	6.5	8.0	0.408	14	**5.51**	5.0	5.8	0.280
LCr	16	**17.34**	16.76	17.84	0.280	23	**17.18**	16.59	18.02	0.361	31	**16.31**	15.87	16.68	0.210
LCb	16	**16.12**	15.38	16.82	0.315	23	**15.93**	15.41	16.85	0.336	31	**15.17**	14.68	15.48	0.203
LaZ	16	**9.01**	8.78	9.28	0.162	22	**9.02**	8.65	9.93	0.322	30	**8.55**	8.32	8.79	0.120
LaI	16	**3.50**	3.22	3.67	0.124	23	**3.40**	3.12	3.67	0.143	31	**3.22**	2.93	3.48	0.126
LaN	16	**8.52**	8.32	8.83	0.134	23	**8.47**	7.71	8.80	0.242	31	**8.18**	7.62	8.59	0.200
ANc	16	**5.53**	5.32	5.64	0.091	23	**5.45**	5.17	5.76	0.138	31	**5.34**	5.13	5.58	0.102
LBT	16	**4.68**	4.45	4.87	0.105	23	**3.84**	3.66	4.07	0.103	31	**4.42**	4.22	4.71	0.120
CC	16	**3.80**	3.68	3.92	0.080	23	**6.24**	5.96	6.61	0.148	31	**3.60**	3.42	3.75	0.082
M^{3}M^3	16	**6.25**	6.02	6.42	0.120	23	**5.64**	5.41	5.92	0.128	30	**5.87**	5.51	6.14	0.149
CM^3	16	**5.65**	5.47	5.85	0.102	23	**10.89**	10.40	11.46	0.263	31	**5.36**	5.13	5.59	0.110
LMd	16	**10.97**	10.30	11.19	0.226	23	**3.04**	2.72	3.28	0.156	31	**10.20**	9.83	10.52	0.155
ACo	16	**3.04**	2.67	3.28	0.170	23	**6.18**	5.93	6.75	0.185	31	**2.99**	2.82	3.20	0.079
CM$_3$	16	**6.18**	5.93	6.35	0.121	23	**4.63**	4.43	4.89	0.142	31	**5.78**	5.37	6.13	0.149
CM^3/LCb	16	**0.35**	0.34	0.36	0.006	23	**0.35**	0.34	0.37	0.007	31	**0.35**	0.34	0.37	0.006
CC/CM^3	16	**0.67**	0.64	0.70	0.017	23	**0.68**	0.66	0.71	0.014	31	**0.67**	0.64	0.70	0.015
M^{3}M^3/CM^3	16	**1.11**	1.07	1.14	0.026	23	**1.11**	1.06	1.15	0.027	31	**1.06**	0.00	1.16	0.197

	P. christii Nile Valley & Siwa Oasis (Egypt)					*P.* cf. *christii* Southern Palestine & Sinai				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	6	**38.37**	36.4	40.2	1.536	8	**39.85**	38.1	40.8	0.999
LPol	5	**5.26**	5.0	5.6	0.270	8	**5.41**	5.0	5.7	0.259
LCr	6	**16.31**	16.02	16.62	0.239	12	**16.92**	16.67	17.72	0.316
LCb	6	**15.25**	14.93	15.57	0.253	12	**15.75**	15.43	16.37	0.279
LaZ	6	**8.39**	8.07	8.62	0.210	10	**8.55**	8.35	8.78	0.113
LaI	6	**3.16**	2.98	3.27	0.108	13	**3.22**	3.02	3.38	0.097
LaN	6	**7.90**	7.49	8.22	0.262	13	**8.03**	7.78	8.22	0.144
ANc	6	**5.24**	5.02	5.52	0.204	13	**5.30**	5.12	6.02	0.238
LBT	6	**4.46**	4.31	4.55	0.095	13	**4.71**	4.48	4.90	0.111
CC	6	**3.39**	3.33	3.47	0.055	13	**3.52**	3.20	3.78	0.146
M^{3}M^3	6	**5.75**	5.42	5.94	0.216	13	**6.04**	5.77	6.35	0.188
CM^3	6	**5.31**	5.18	5.40	0.076	13	**5.71**	5.58	6.07	0.140
LMd	6	**10.19**	9.98	10.41	0.171	13	**10.62**	10.32	11.13	0.212
ACo	6	**2.84**	2.69	2.94	0.105	13	**3.00**	2.74	3.17	0.119
CM$_3$	6	**5.71**	5.60	5.87	0.101	13	**6.14**	5.90	6.85	0.269
CM^3/LCb	6	**0.35**	0.34	0.35	0.004	12	**0.36**	0.35	0.37	0.008
CC/CM^3	6	**0.64**	0.62	0.65	0.012	13	**0.62**	0.57	0.64	0.018
M^{3}M^3/CM^3	6	**1.08**	1.02	1.12	0.042	13	**1.06**	1.02	1.11	0.026

(1923) from Jeiroud. This individual was examined only by Harrison (1964a) and he found it to be similar in coloration and dimensions to southern Palestinian individuals. However, Nader & Kock (1990a) and Qumsiyeh (1996) doubted this statement. Nader & Kock (l.c.) designated *Plecotus* records from northern parts of the Near East (incl. Syrian and N Palestinian ones) as *P. austriacus* subsp. indet., whereas the records from Sinai and southern Palestine as *P. austriacus* *christii* and those from W Turkey as *P. a. austriacus*. Qumsiyeh (1996) noted: "the specimens from some parts of the Holy Land (north and west) are slightly larger than the Egyptian ones and may represent *P. a. austriacus*, these from the Syrian Desert in the southeast of the Holy Land are closer to *P. a. christiei*".

The only Syrian individuals identified by genetic and morphological analyses are those presented here. All the genetically analysed bats – coming from Yabroud, Ras al Ain, and Maalula – were determined as *P. macrobullaris* (Juste et al. 2004, Benda et al. 2004c). According to morphological data, all Syrian bats (including the MNHN one from Jeiroud) form a homogenous unit consistent with other comparative material of *P. macrobullaris* from Turkey, the Caucasus and Iran (Table 32, Figs. 154–156; cf. Benda et al. 2004c).

However, *P. macrobullaris* from all regions of the Near East is very close to the *Plecotus* individuals from the southern Levant (Sinai, S Palestine, Jordan) in general size characters (Table 32, Fig. 154), i.e. of *P.* '*austriacus christii*' according to the above mentioned authors. On the other hand, *P. christii* from Sahara differs very markedly from the southern Levantine bats in size, being significantly smaller and resembling rather *P.* '*t.*' *kolombatovici* (Fig. 154). Benda et al. (2004c) found *P. christii* to be characteristic in extremely narrow rostral part of the skull, beside other criteria. In this character, the southern Levantine bats show very similar values as *P. christii* and clearly differ from the two remaining *Plecotus* species of the Near East (comp. values of CC/CM^3 and of M^{3}M^3/CM^3 in all populations, see Table 32, cf. Figs. 155, 156). Thus, *Plecotus* populations from Sinai, southern Palestine and Jordan should constitute a larger form of the nominotypical, small Saharan *P. christii*. Here, we tentatively name this form as *P.* cf. *christii*, however, its actual systematic position can be probably confirmed by a genetic analysis only. Anyway, it represents

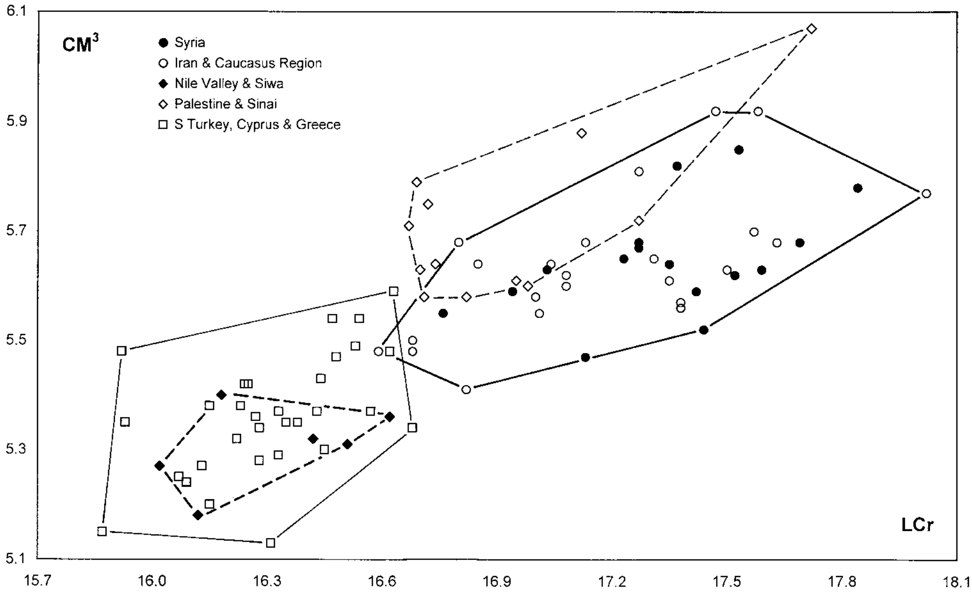

Fig. 154. Bivariate plot of examined Syrian and comparative samples of the genus *Plecotus* Geoffroy, 1818: greatest length of skull (LCr) against the length of upper tooth-row (CM^3). Explanation: bold-lined polygon = *P. macrobullaris* Kuzjakin, 1965 (n=39); thin-lined polygon = *P.* '*t.*' *kolombatovici* (n=31); bold-dashed polygon = *P. christii* (n=6); thin-dashed polygon = *P.* cf. *christii* (n=12). For taxonomic details see text.

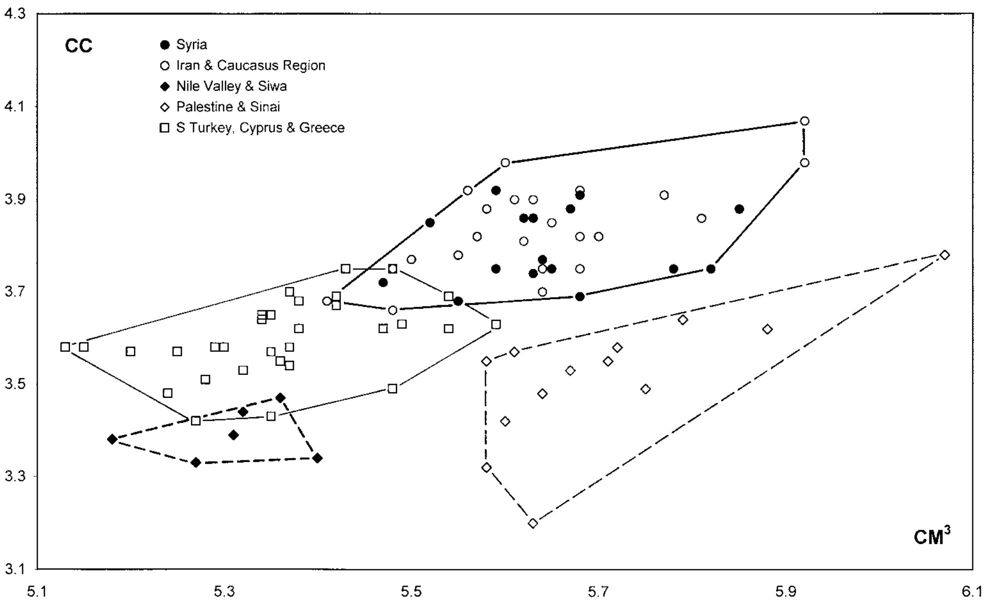

Fig. 155. Bivariate plot of examined Syrian and comparative samples of the genus *Plecotus* Geoffroy, 1818: length of upper tooth-row (CM^3) against the rostral width between canines (incl.) (CC). For explanation see Fig. 154.

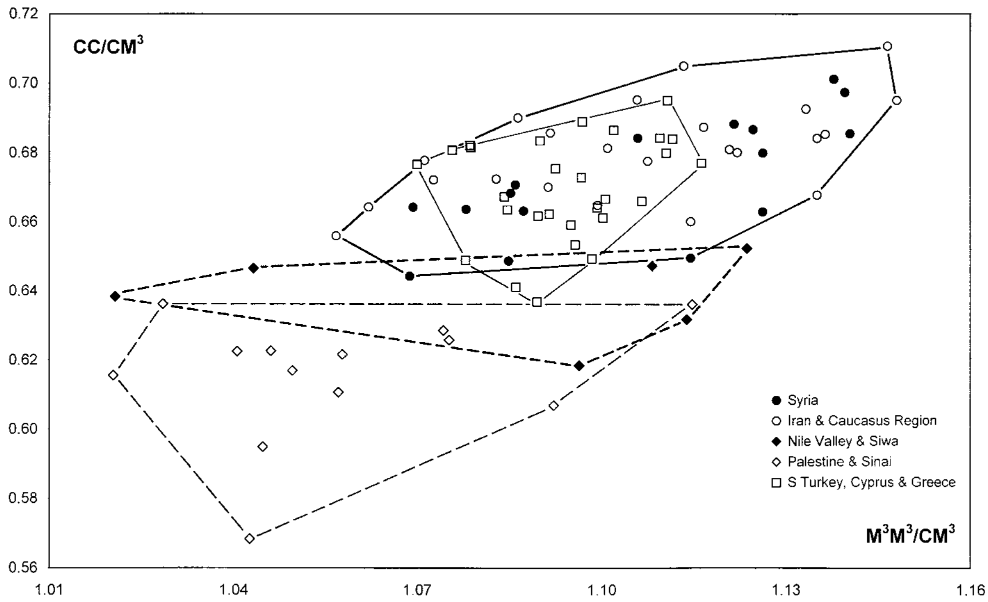

Fig. 156. Bivariate plot of examined Syrian and comparative samples of the genus *Plecotus* Geoffroy, 1818: relative posterior width of rostrum (M^{3}M^3/CM^3) against relative anterior width of rostrum (CC/CM^3): For legend see Fig. 154.

a distinct morphotype, which differs from all other geographically close taxa. However, based on the material currently known, it does not occur as nordward as in Syria.

The subspecific position of Syrian populations of *P. macrobullaris* is clear from the comparison by Benda et al. (2004c). They identified all populations of this species from the Middle East (incl. the Syrian samples) to belong to the nominotypical subspecies, whereas its another form, *P. m. alpinus* Kiefer et Veith, 2002 (t.t.: Ristolas, France) is reported to occur in southern European mountains (Spitzenberger et al. 2003, Benda et al. 2004c, Kiefer & von Helversen 2004a).

Coloration of Syrian individuals of *P. macrobullaris* does not differ from other samples coming from the Middle East (Turkey, Iran) and generally corresponds with the description given by Spitzenberger et al. (2003, 2006). The dorsal pelage is greyish brown, the distal third of dorsal hairs is pale greyish beige, the proximal part is dark brownish grey; the ventral side is dirty whitish, the distal half of ventral hairs is creamy whitish, the proximal part is dark brownish grey. Naked parts are uniformly pale greyish brown. The overall coloration resembles that of *P. t. gaisleri* of northwestern Africa (Benda et al. 2004c) and differs from rather pale brown of *P.* '*t.*' *kolombatovici* and very pale greyish-beige of *P. christii* (Fig. 157). In all examined specimens of *P. macrobullaris* from the Middle East, the triangular fibrous pad in the middle of the lower lip is present, similarly as described for European populations (Spitzenberger et al. 2002, Tvrtković et al. 2005; see Fig. 153). As observed in alcohol specimens, the pad is pale grey or simply without noticeable pigmentation.

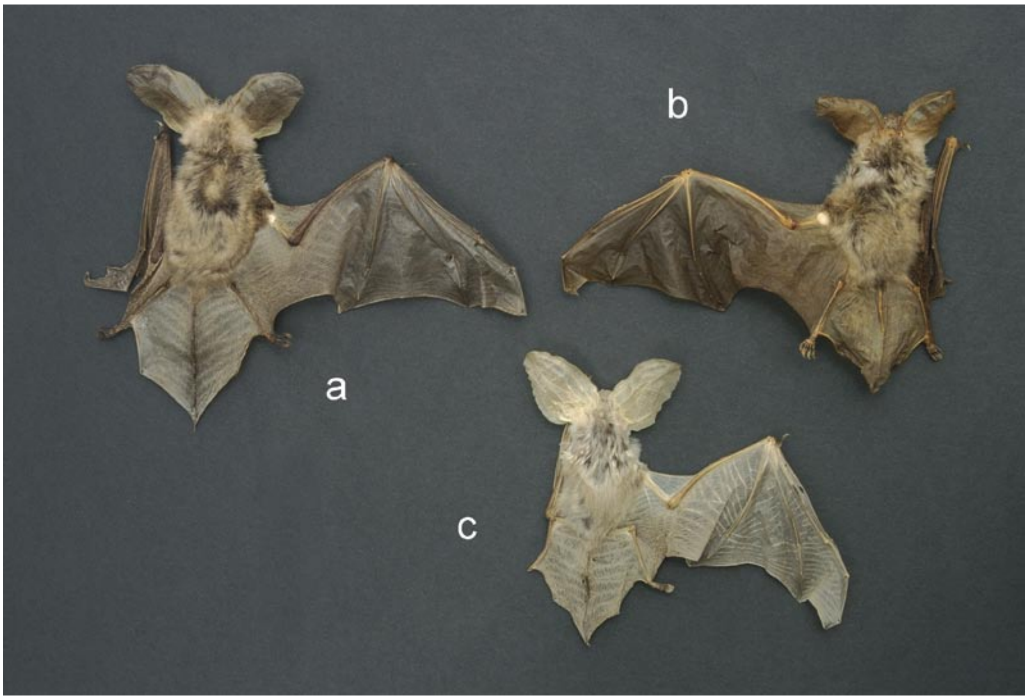

Fig. 157. Pelage coloration in the genus *Plecotus* Geoffroy, 1820: a – *P. macrobullaris* Kuzjakin, 1965, female, NMP 48991, Syria, Maalula; b – *P.* '*t.*' *kolombatovici* Đulić, 1980, male, NMP 48087, Turkey, Çevlik; c – *P. christii* Gray, 1838, male, NMP 90118, Egypt, Bir Nagat, Qattar Mts.

P. macrobullaris is the only *Plecotus* species confirmed to occur in Syria, being restricted to the limited area of the Anti-Lebanon Mts (see Distribution). Although its records are well presumable also in the highest parts of the Jebel An Nusariyah Mts, the occurrence of *P.* '*t.*' *kolombatovici* is more probable in the Mediterranean northwestern part of Syria. This species lives in Turkish Hatay and on the Cilician coast (Fig. 151). However, our field investigation as well as the morphological comparison of the available museum material did not confirm its occurrence in Syria (see also Spitzenberger et al. 2006).

Feeding ecology. Representatives of the genus *Plecotus* are small to medium-sized bats with a gleaning foraging strategy, hunting in cluttered habitats and feeding mostly on Lepidoptera, less on Diptera, sometimes only with a use of passive listening. These facts result from the studies of wing morphology and echolocation, from diet analyses and from experiments with animals held in captivity (Bauerová 1982, Norberg & Rayner 1987, Barataud 1990, Anderson & Racey 1991, Beck 1995, Andreas 2002, etc.).

Some data are available concerning the diet of the genus *Plecotus* in the Middle East. Whitaker et al. (1994) analysed five pellets of *P. austriacus* (= *P.* cf. *christii*, see above) from Palestine and they contained 100% of Lepidoptera. Feldman et al. (2000) found 78.5% of volume of Lepidoptera and small proportions of Trichoptera, Coleoptera and Diptera in the diet of *P. austriacus* (= *P.* cf. *christii*) in the Dead Sea area, Palestine. Almost no data are available on the diet of *P. macrobullaris* (cf. Kiefer & von Helversen 2004a). The only information regarding its diet composition comes from northwestern Iran, where all the samples analysed contained only Lepidoptera (cf. Benda et al. 1999b).

From Syria, we analysed two faeces samples of *P. macrobullaris*, coming from Yabroud and Ras al Ain. The following prey categories were recorded: the main part was Lepidoptera (100% and 98% of volume, respectively), complemented with Coleoptera (1%) and Neuroptera (1%). These data well correspond with our previous results from northwestern Iran and other studies concerning the genus *Plecotus*.

***Miniopterus schreibersii* (Kuhl, 1817)**

records. **Original data**: Al Lathiqiyeh: Al Lathiqiyeh [1], 1 ma, 1 fa (specimens in MNHN); – Slinfeh [2], above a temporary water pit, 2 May 2001: det. several inds. – Der'a: Talsh'hab [3], waterfall in the Al Yarmuk Valley, 25 May 2001: net. 1 ma. – Halab: Halab [4], 4 July 1914: nursery colony (coll. 13 m, 4 faG, 32 fa, 9 fs; specimens in NMW). – Homs: Qala'at al Hosn [5], ruins of Krak des Chevaliers, 29 May 2001: coll. 1 ms; Qala'at al Hosn, castle ruins, under a castle bridge, 10 May 2001: net. 1 fa. – Tartus: Safita [6], above a river ca. 5 km to SE, 29 May 2001: net. 4 faL. – **Published data**: Halab: Aleppo (= Halab) [4], 13–23 March 1910: 3 ma, 1 ms, 19 fa, 1 fs (von Wettstein 1913; but modified according to examination of NMW specimens, see Material examined – von Wettstein 1913 gave 'April 1910: 3 m, 25 f'). – Raqqa: Cater (= Qatr) Magara cave [7], 1993: 3 inds. (from osteological cave deposit), 1994: net. 13 inds., obs. 200 inds. (Ebenau 1994, 1996); – Raqqa, 'Taubenbrunnen' cave [8], 1993: 43 inds. (from osteological cave deposit), 10 March 1994: net. 5 inds., obs. 400 inds., coll. parasites (Ebenau 1994, 1996, Walter & Ebenau 1997). – Quneitra / Golan Heights: Mount Hermon [9], 2 May 1995: 1 faL, 20 June 1995: net. several males, 11 September 1995: net. several males (Mendelssohn & Yom-Tov 1999).

Possible records (Syria *sensu lato*). **Published data**: Syria (Dobson 1876). – Syrie (Trouessart 1879). – Syria (Anderson 1881). – Syrie, 1878: 2 inds. ad. (Jentink 1888). – Syria, 1 fa (Harrison 1953).

Distribution. **General**. *Miniopterus schreibersii* is a species with the Mediterranean type of distribution (Koopman 1994, Horáček et al. 2000, Boye 2004). It inhabits the Maghreb, Tripolitania and Cyrenaica in North Africa, in southern Europe *M. schreibersii* occurs from Iberia and central France over Central Europe to the Balkans and Crimea, the entire European Mediterranean including most of the larger islands; the Near East and the Caucasus Region, to southern Turkmenistan and Afghanistan (Bates & Harrison 1997, Horáček et al. 2000). According to modern taxonomy, the Afro-tropical and Oriental forms formerly assigned to *M. schreibersii* are considered different species (Maeda 1982, Appleton et al. 2004, Tian et al. 2004, Miller-Butterworth et al. 2005), see Taxonomy.

Near East. *M. schreibersii* inhabits mostly the Mediterranean habitats of the Near East, it marginally penetrates also into deserts (Khajuria 1988, Harrison & Bates 1991, Horáček & Benda 1998, Mendelssohn & Yom-Tov 1999, Ebenau 1996). In the Near East as well as in the Maghreb, this species reaches southern margin of its distribution range.

M. schreibersii is one of the most common bats in Turkey (Benda & Horáček 1998), its numerous records come from all parts of the country (Strinati 1959, Kahmann & Çağlar 1960, Çağlar 1965, 1969, von Lehmann 1966, Corbet & Morris 1967, DeBlase & Martin 1973, Spitzenberger 1973, Kock 1974, Van Winden 1988, von Helversen 1989, Albayrak 1990a, 1993a, 2003, Obuch 1994, Aktaş & Hasbenli 1994, Steiner & Gaisler 1994, Hasbenli 1997, Benda & Horáček 1998, Albayrak & Coşkun 2000, Özgül et al. 2000, Furman & Özgül 2002, Karataş & Sözen 2004, Yiğit et al. 2006, Karataş & Sachanowicz in press).

Three records of *M. schreibersii* are available from Lebanon; from near Amchite (Lewis & Harrison 1962), Anajr [Aanjar] (Atallah 1970), and from Rouways (Tohmé & Tohmé 1985). In Palestine, this bat was for a long time considered a common part of the fauna (Tristram 1884, Bodenheimer 1935, 1958, Dor 1947), however, the accurate records are not very frequent and come from the northern part of the country, from Judea to the Galilee and the Hula Valley (Festa

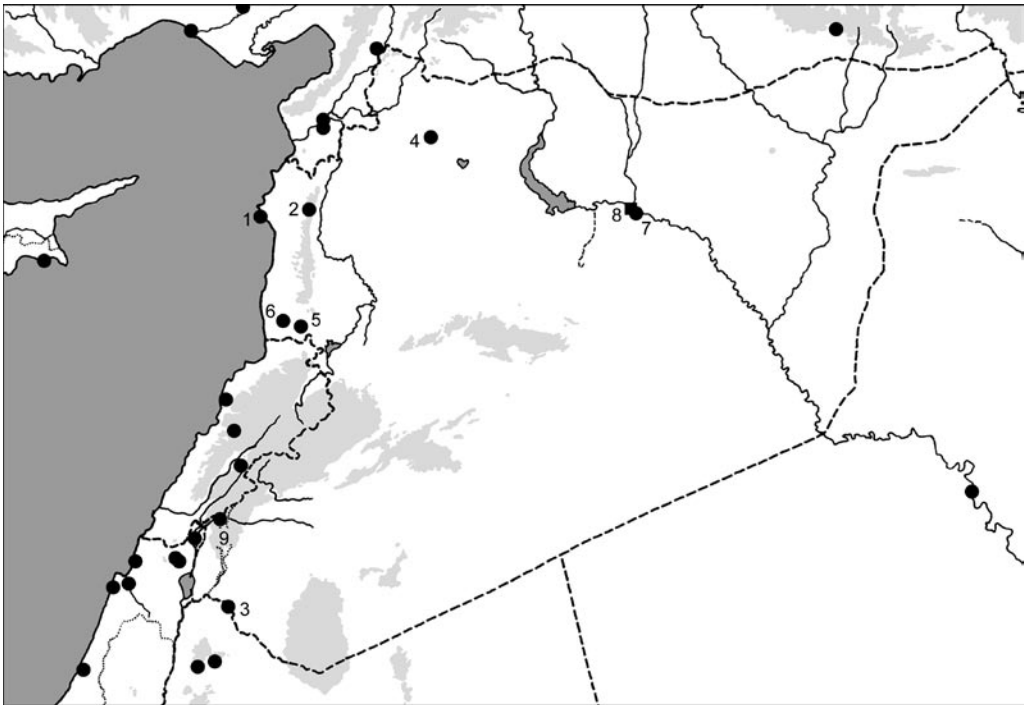

Fig. 158. Records of *Miniopterus schreibersii* (Kuhl, 1817) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

1894, Harrison 1964a, Theodor 1967, Makin 1977, 1987, Mendelssohn & Yom-Tov 1999, Ferguson 2002, Miller-Butterworth et al. 2005). Only two records of this species were mentioned from Jordan, both from the Ajloun Hills in the northwestern part of the country (Harrison 1956a, Harrison & Bates 1991).

One Iraqi finding is available from its northern, Mediterranean zone (Harrison 1956a), however, another one has been mentioned from the Haditha region in the Euphrates Valley (Khajuria 1988). In Iran, a plenty of records comes from the Zagros Range and the Armenian Highlands (Etemad 1967, Lay 1967, DeBlase 1980, Sharifi et al. 2002, our unpubl. data). Several findings of *M. schreibersii* have been made in Cyprus (Bate 1903, Lay 1967, Kock 1989, Boye et al. 1990, our unpubl. data).

The records known from the southwestern part of the Arabian Peninsula, formerly identified as of *M. schreibersii arenarius* Heller, 1912 (Nader 1982, Nader & Kock 1987), most probably represent the Afro-tropical species *M. natalensis* Smith, 1834 (see Appleton et al. 2004, Miller-Butterworth et al. 2005), see also Taxonomy.

Syria (Fig. 158). *M. schreibersii* is a medium-frequent bat in Syria, 9 records are available from the country (Table 1). It has been recorded in two different regions of Syria. Most records come from the Mediterranean part of the country; seven records are known from the coastal region and the Jebel An Nusariyah Mts [1, 2, 5, 6] and from the southwestern part of the country, adjacent to the Rift Valley, the Al Yarmuk Valley and Mount Hermon [3, 9] (Mendelssohn & Yom-Tov 1999). Two records are available from the semi-desert region of the Euphrates Valley [7, 8] (Ebenau 1994, 1996). The oldest accurate finding of *M. schreibersii* in Syria comes from Halab [4] (von Wettstein 1913); it creates an ecological transition between the two above regions, being situated in the zone of Mediterranean steppe-maquis (Zohary 1973). Syrian records well connect the known occurrence in the surrounding areas both of the Levant as well as of Mesopotamia (see above).

FIELD NOTES. We found only one roosting individual of *Miniopterus schreibersii* in Syria, a male was collected in the dungeon of Krak des Chevaliers (Qala'at al Hosn, Fig. 8). However, roosts of colonies were reported by Ebenau (1994, 1996) from two caves in the Euphrates valley, where 200 and 400 individuals were observed, respectively.

At two places, *M. schreibersii* was recorded by netting above water bodies and once under a bridge span (at Krak des Chevaliers). Above a small lake below the waterfall in the Al Yarmuk Valley at Talsh'hab (Fig. 6), a male was caught, and four females were netted above a river ca. 5 km southeast of Safita. Five and thirteen individuals were captured in the nets installed at two caves situated in the Euphrates valley (Ebenau 1994, 1996). Mendelssohn & Yom-Tov (1999) reported nettings of several males on Mount Hermon.

The roost of *M. schreibersii* in the ruins at Qala'at al Hosn was occupied also by *R. ferrumequinum*, *R. hipposideros* and *M. blythii*. The cave roosts of *M. schreibersii* colonies (Ebenau 1994, 1996) were shared with *R. ferrumequinum*, *R. mehelyi* and *M. capaccinii* (Qatr Magara) and with *M. capaccinii* only ('Taubenbrunnen'), respectively. During the netting sessions, the following species were also recorded: *R. aegyptiacus*, *M. nattereri*, *P. kuhlii*, and *T. teniotis* (Talsh'hab), *N. noctula*, *E. serotinus* and *P. kuhlii* (Safita), *E. serotinus*, *E. bottae* and *P. kuhlii* (Qatr Magara; Fig. 18; Ebenau 1994, 1996), and *M. capaccinii* ('Taubenbrunnen'; Ebenau 1994, 1996).

We recorded only one sign of reproduction in *M. schreibersii* from Syria; four females netted at Safita on 29 May 2001 were in lactation. However, the examined NMW material, collected by V. Pietschmann at Halab on 4 July 1914, includes also four pregnant females. Mendelssohn & Yom-Tov (1999) reported on a lactating female caught on Mount Hermon on 2 May. Aşan Baydemir & Albayrak (2006) found pregnant females in different parts of Anatolia from April to June and lactating ones in June and July. These data suggest dispersed timing of births in the Near East.

In the Middle East, *M. schreibersii* has been known from owl diet from Palestine (Dor 1947), Turkey (Obuch 1994) and Iran (Obuch unpubl.), however, no similar data are available from Syria.

MATERIAL EXAMINED. 3 ma, 1 ms, 19 fa, 1 fs (NMW 22088–22101 [S+A], 22102–22111 [A]), Aleppo (= Halab), 13–23 March 1910, leg. V. Pietschmann, Mesopotamien-Expedition 1910; – 3 ma, 10 ms, 4 faG, 32 fa, 9 fs (NMW 22112–22144 [S+A], 22145–22167 [A]), Aleppo (= Halab), 4 July 1914, leg. V. Pietschmann, Armenien-Expedition 1914; – 1 ma, 1 fa (MNHN 1876-337, 338 [A]), Lattakié (= Al Lathiqiyeh), leg. M. Deyrolle; – 2 fa (NMP 48873, 49989 [S+A]), Qala'at al Hosn, 10 and 29 May 2001, leg. M. Andreas, R. Lučan, A. Reiter & D. Weinfurtová; – 4 fa (NMP 48880, 48881, 48883 [S+A], 48882 [S+B]), Safita, 29 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová; – 1 ma (NMP 48861 [S+A]), Talsh'hab, 25 May 2001, leg. M. Andreas, P. Benda, A. Reiter & D. Weinfurtová.

MORPHOLOGY. See Table 33 and Appendix III for biometric data on the Syrian specimens of *Miniopterus schreibersii*.

TAXONOMY. *Miniopterus schreibersii* was considered a widespread and polytypic species for a long time. Up to 16 subspecies were recognised within the Mediterranean, southern Asia and the Australasian region (e.g., Tate 1941c, Ellermann & Morrison-Scott 1951, Corbet 1978, Corbet & Hill 1992, Koopman 1994, Borisenko & Pavlinov 1995, Simmons 2005) and up to five more in the Afro-tropics (Hayman & Hill 1971, Corbet 1978, Koopman 1993). However, such arrangement has been refused in the last years, based on results of genetic analyses (Appleton et al. 2004, Tian et al. 2004, Miller-Butterworth et al. 2005). According to this view, *M. schreibersii* s.s. represents a southwestern Palaearctic faunal element occurring in southern Europe, supra-Saharan Africa and southwestern Asia as eastwards as Afghanistan (Gaisler 1970, Maeda 1982). The Afro-tropical and Oriental named forms formerly assigned to *M. schreibersii* (*arenarius*, *bassanii*, *blepotis*, *breyeri*, *chinensis*, *dasythrix*, *eschscholtzii*, *fuliginosus*, *fuscus*, *haradai*, *japoniae*, *magnater*, *majori*, *natalensis*, *oceanensis*, *orianae*, *parvipes*, *ravus*, *scotinus*, *smitianus*, *vicinior*, *villiersi*, *yayeyamae*) are presently considered separate species or their synonyms. However, a similar division considering such geographical limits of *M. schreibersii* s.s. was suggested already by Maeda (1982) who performed a profound morphometric analysis.

According to most authors, the presently restricted species rank of *M. schreibersii* s.s. consists of two subspecies, *M. s. schreibersii* (Kuhl, 1817) (terra typica: Kuhl 1817 gave 'Columbäzer Höhle, im südöstlichen Gebirge des Bannats'; Miller 1912 referred to it as the Kulmbazer Cave, mountains of southern Bannat, Hungary; Ansell & Topál 1976 restricted t.t. to the Kolumbács Cave, left bank of the Danube river, near Coronini, Romania) and *M. s. pallidus* Thomas, 1907 (t.t.: 'South coast of Caspian'; Lay 1967 restricted t.t. to 'the vicinity of Bandar-i-Gaz' [Golestan Province], Iran). Most frequently, the populations of *M. schreibersii* from the Middle East have been assigned to the only form, *M. s. pallidus* (Harrison 1964a, Atallah 1977, Corbet 1978, Harrison & Bates 1991, Boye 2004), while the whole European distribution range has been considered to be inhabited by the nominotypical subspecies*. Also the populations of supra-Saharan Africa are supposed to belong to the latter form (Aellen & Strinati 1970, Qumsiyeh & Schlitter 1982, Gaisler 1983, Kowalski & Rzebik-Kowalska 1991).

Thomas (1907) described the subspecies *Miniopterus Schreibersi pallidus* on the basis of a different coloration. He reported the dorsal pellage in the new subspecies to be wood-brown, while that of *M. s. schreibersii* rather darker than broccoli-brown. The ventral pelage was described as 'more or less suffused with buffy' in the new form and as smoky grey in the nominotypical

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* NOTE. Heinrich (1936) described a subspecies *M. s. inexpectatus* from the easternmost part of the Balkans (terra typica: bulgarischer Strandjabalkan = Strandža Mts, E Bulgaria) based on specimens with bicoloured pelage, obviously due to moulting. The name has generally been considered a junior synonym of the nominotypical subspecies (Ellerman & Morrison-Scott 1951, Kahmann & Çağlar 1960, Hanák 1964, Corbet 1978, Simmons 2005, etc.).

Table 33. Basic biometric data on examined Syrian and comparative samples of *Miniopterus schreibersii* (Kuhl, 1817). For abbreviations see pp. 10, 11

	Syria					Turkey, Cyprus & Lebanon					Iran				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	55	**46.15**	43.9	48.2	0.883	24	**44.91**	43.8	46.3	0.661	11	**46.59**	45.3	48.0	0.890
LCr	55	**15.37**	14.74	15.84	0.248	42	**15.01**	14.63	15.52	0.214	10	**15.40**	15.10	15.76	0.239
LCb	55	**14.97**	14.40	15.57	0.250	42	**14.56**	14.23	15.05	0.181	10	**15.01**	14.67	15.32	0.240
LaZ	51	**8.78**	8.52	9.02	0.134	42	**8.55**	8.17	8.73	0.109	10	**8.83**	8.58	9.19	0.177
LaI	55	**3.59**	3.39	3.73	0.074	42	**3.57**	3.33	3.74	0.086	10	**3.57**	3.42	3.79	0.112
LaN	55	**8.10**	7.81	8.40	0.118	42	**7.90**	6.52	8.23	0.256	10	**8.13**	7.93	8.29	0.111
ANc	7	**6.21**	6.03	6.33	0.098	42	**6.29**	6.02	6.50	0.125	10	**6.63**	6.32	8.19	0.558
CC	7	**4.63**	4.50	4.75	0.098	40	**4.57**	4.37	4.72	0.079	10	**4.65**	4.33	4.81	0.151
M^3M^3	7	**6.40**	6.28	6.48	0.078	41	**6.33**	6.11	6.47	0.093	10	**6.50**	6.27	6.64	0.135
CM^3	55	**6.01**	5.73	6.18	0.106	41	**5.91**	5.76	6.07	0.078	10	**6.05**	5.85	6.21	0.112
LMd	55	**11.01**	10.62	11.42	0.182	41	**10.68**	10.41	11.17	0.158	10	**11.02**	10.72	11.34	0.159
ACo	7	**2.58**	2.51	2.67	0.048	41	**2.54**	2.33	2.77	0.105	10	**2.59**	2.49	2.71	0.069
CM_3	55	**6.41**	6.16	6.58	0.098	39	**6.29**	6.13	6.42	0.070	10	**6.46**	6.33	6.65	0.115

	Central Europe					Southern Europe					Balkans				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	27	**45.72**	40.5	47.0	1.225	12	**45.78**	44.0	46.8	0.759	110	**45.77**	41.2	48.0	1.006
LCr	45	**15.35**	14.97	15.92	0.226	12	**15.29**	15.02	15.48	0.164	91	**15.14**	14.52	15.75	0.234
LCb	46	**14.85**	14.37	15.38	0.215	12	**14.84**	14.52	15.02	0.152	92	**14.69**	14.00	15.17	0.215
LaZ	19	**8.66**	8.38	9.15	0.201	9	**8.57**	8.21	8.76	0.170	81	**8.56**	8.18	8.85	0.135
LaI	49	**3.67**	3.32	3.90	0.114	12	**3.61**	3.49	3.76	0.079	99	**3.60**	3.33	3.84	0.090
LaN	47	**8.07**	7.89	8.35	0.118	12	**8.03**	7.88	8.27	0.120	95	**8.03**	7.67	8.38	0.136
ANc	32	**6.32**	6.12	6.55	0.106	11	**6.38**	6.26	6.61	0.104	93	**6.29**	5.92	6.54	0.112
CC	28	**4.61**	4.45	4.87	0.100	11	**4.55**	4.43	4.62	0.067	88	**4.52**	4.11	4.74	0.118
M^3M^3	35	**6.37**	6.05	6.62	0.106	12	**6.38**	6.26	6.75	0.133	91	**6.34**	5.36	6.62	0.161
CM^3	48	**5.97**	5.80	6.27	0.105	12	**5.99**	5.88	6.05	0.044	96	**5.92**	5.75	6.17	0.081
LMd	50	**10.92**	10.55	11.23	0.168	12	**10.92**	10.68	11.18	0.135	89	**10.78**	10.41	11.08	0.144
ACo	35	**2.53**	2.32	2.77	0.098	12	**2.66**	2.47	2.79	0.102	90	**2.50**	2.16	2.84	0.100
CM_3	50	**6.36**	6.13	6.55	0.091	12	**6.37**	6.29	6.48	0.072	89	**6.31**	6.13	6.48	0.076

	Maghreb					Yemen				
	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	11	**46.29**	45.5	47.7	0.748	7	**44.40**	43.3	45.3	0.627
LCr	43	**14.96**	14.48	15.53	0.241	6	**14.86**	14.56	15.02	0.169
LCb	43	**14.52**	14.09	15.23	0.264	6	**14.42**	14.06	14.62	0.205
LaZ	42	**8.50**	8.11	9.04	0.191	6	**8.45**	8.27	8.66	0.150
LaI	43	**3.60**	3.43	3.92	0.109	6	**3.63**	3.58	3.71	0.053
LaN	43	**7.99**	7.76	8.28	0.128	6	**7.64**	7.57	7.71	0.061
ANc	43	**6.26**	6.03	6.54	0.124	6	**6.08**	5.94	6.23	0.105
CC	37	**4.53**	4.31	4.86	0.135	6	**4.43**	4.32	4.55	0.092
M^3M^3	43	**6.26**	6.03	6.64	0.149	6	**6.41**	6.28	6.59	0.116
CM^3	43	**5.86**	5.68	6.16	0.099	6	**5.86**	5.63	5.96	0.122
LMd	43	**10.70**	10.28	11.21	0.168	6	**10.52**	10.29	10.67	0.134
ACo	43	**2.58**	2.32	2.75	0.094	6	**2.37**	2.32	2.46	0.053
CM_3	43	**6.22**	6.03	6.56	0.112	6	**6.29**	6.05	6.41	0.126

form. This new name was adopted by Russian authors (Satunin' 1909, 1914, Bobrinskoy 1925, Ognev 1927, 1928, Strelkov 1963, 1981, Kuzjakin 1965, Strelkov et al. 1978, Pavlinov & Rossolimo 1987, Rakhmatulina 1995, Rahmatulina 2005, etc.) for the populations inhabiting some arid regions of the south of the Russian Empire or Soviet Union, respectively, i.e. eastern parts of Transcaucasia and southern Turkmenistan.

Harrison (1956a) described another subspecies from the Middle East, *M. s. pulcher* Harrison, 1956 (t.t.: Ser'Amadia, Kurdistan, N. Iraq) differing from *M. s. schreibersii* and *M. s. pallidus* by much paler and greyish dorsal fur coloration. This arrangement was adopted by several subsequent authors (Harrison 1956c, Bodenheimer 1958, Hatt 1959, Lewis & Harrison 1962). However, Aellen (1959) suggested a synonymy of the forms *pulcher* and *pallidus*, and it was accepted by Harrison (1964a) and subsequent authors (see above). Moreover, Etemad (1967) found individuals of an intermediate coloration between *pulcher* and *pallidus* as well as *pallidus* and *pulcher* coloration morphs in Iran and concluded that *pulcher* is therefore a junior synonym of *pallidus*.

As the metric characters of the west-Palaearctic populations do not show any substantial differences (see also Table 33), Kuzjakin (1950) suggested that the colour characters given for the form *M. s. pallidus* in fact reflected only seasonal colour changes and did not deserve any taxonomic expression. A similar conclusion was presented also by Lay (1967): "*pallidus* and *pulcher* represent different stages in the annual pelage colour change of *M. schreibersi* and should be regarded as synonyms of it". However, this opinion has not been validated (see e.g. Kuzjakin 1965, Corbet 1978, DeBlase 1980, Harrison & Bates 1991, Horáček et al. 2000, etc.), although Ferguson (2002) mentioned the subspecies *M. s. schreibersii* from Palestine (without giving any details). However, substantiation for the division of *M. schreibersii* into European and west-Asian subspecies was given by genetic analyses by Miller-Butterworth et al. (2005) and Bilgin et al. (2006), who found significant genetic differences between these samples (see below for details).

According to the above mentioned review, the Syrian populations of *M. schreibersii* could belong to the subspecies *M. s. pallidus*. The geographic position of Syria in the centre of the Middle East as well as the rather paler pelage coloration of Syrian individuals could conform with this identification. However, some authors suggested only a partial occupancy of the Middle East by *M. s. pallidus*, i.e. in the arid regions, while *M. s. schreibersii* seems to occur in its Mediterranean parts (see Horáček et al. 2000). Based on such opinion, both forms may be present in Syria.

Turkish populations have a crucial position for understanding of the intraspecific variation in *M. schreibersii* in the eastern Maditerranean region, see also the reviews by Benda & Horáček (1998) and Karataş & Sözen (2004). Strinati (1959) referred his samples from Thrace and north-westernmost Anatolia to *M. s. schreibersii**. Steiner & Gaisler (1994) considered west-Anatolian samples (from the Marmara Sea coast) to belong to *M. s. schreibersii*, and those from northeastern Anatolia (from near Trabzon and Ispir) to *M. s. pallidus*. On the other hand, Albayrak & Coşkun (2000) suggested the occurrence of *M. s. schreibersii* in Turkey only in Thrace, while the whole of Anatolia was supposed to be inhabited by *M. s. pallidus*, although "only the colours of those from Diyarbakir and Siirt provinces in Anatolia fit well with the original description of *pallidus*; [...] specimens from Anatolia are *pallidus* showing wide colour variations". Karataş & Sözen (2004) carried out a thorough analysis of coloration and metric traits in Turkish populations. They found both subspecies in Anatolia and concluded: "the populations in Thrace, the Marmara region and the western Black Sea region [are] belonging to the nominate form, and those in the eastern Black Sea region, in Central, eastern, southern and southeastern Anatolia to *M. s. pallidus*. The transition between the two subspecies occurs in a wide area extending from the Aegean region to the central Black Sea region, where intermediate forms exist."

The geographic basis for the taxonomic division suggested by Karataş & Sözen (2004) has been well supported by a genetic analysis carried out by Bilgin et al. (2006). They found inconsiderable genetic distances between the Balkan (Bulgarian, Greek, and Turkish) and west-Anatolian samples of *M. schreibersii* (0.2–1.0%) but a sharp genetic break between the Balkan and west-Anatolian samples and the east-Anatolian ones (6.7–7.0%). Such results clearly show the existence of two forms (subspecies or even species) of the *M. schreibersii* complex in the Middle East. Similar results were also given by Miller-Butterworth et al. (2005) who found 6.3% of genetic distance between Palestinian and Spanish representatives of *M. schreibersii*, while *M. natalensis* (South Africa) and *M. s. pallidus* (Palestine) differed by only 4.4% of genetic distance. They therefore suggested that *M. schreibersii* from Palestine and *M. natalensis* shared a more recent common ancestor than did *M. natalensis* and the European populations of *M. schreibersii*.

In conclusion, the synthesis of the above results and/or opinions shows that (1) the European form, *M. s. schreibersii*, really occurs in the northwestern part of the Middle East (W Anatolia); (2) the bats which differed genetically from the nominotypical form were found in eastern Anatolia and Palestine, and these samples could probably represent one subspecies (or species), which inhabits the Levant, incl. Syria; (3) the *Miniopterus* population of the Levant split from the Afro-tropical one later than did the European population from that of the Afro-tropics; and (4) according to the conventional opinions (Corbet 1978, Koopman 1994, Simmons 2005) this form could be named *M. s. pallidus*.

However, also some questions have arisen from the above conclusions: (1) is the topo-typical population of the name *M. Schreibersi pallidus* Thomas, 1907, i.e. from northern Iran, genetically closer to the Levantine population than to the European one? If so, the name *pallidus* is well appropriate for the Levantine population, if not, the almost forgotten name *pulcher* is available. The possibility that the north-Persian population will show closer affinity to European individuals

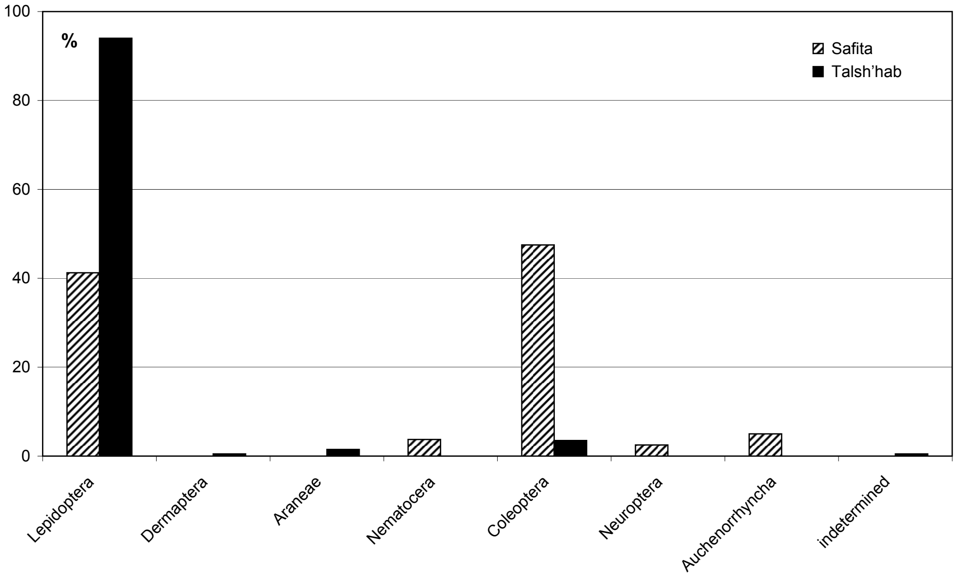

Fig. 159. Volume of particular food items in the diet of *Miniopterus schreibersii* (Kuhl, 1817) from Syria.

is not excluded, as more faunal elements close to European forest fauna are known to inhabit the Hyrcanian region of northern Iran (see e.g. Lay 1967, DeBlase 1980). (2) Do the genetically well separated forms of the eastern Mediterranean occur in allopatry, as suggested by the analysis of a limited material, or do both forms live in sympatry? If the sympatrical occurrence will be proved, the taxonomic status of all names should be revised.

Since these questions remain open, we keep also the final taxonomic assignation of Syrian populations of *M. schreibersii* open, although the name *M.* (*s.*) *pallidus* appears most appropriate for the time being.

Feeding ecology. *Miniopterus schreibersii* is a medium-sized bat flying fast in open areas (cf. Boye 2004). The species has been found to feed predominantly on Lepidoptera, much less on Neuroptera, Diptera and other taxa (Benda et al. 1999b, Lugon & Roue 1999, Presetnik 2002).

We analysed one sample of faecal pellets and contents of seven digestive tracts of *M. schreibersii* from Syria. The analysis of pellets from Talsh'hab and four digestive tracts collected near Safita (Fig. 159) showed high importance of Lepidoptera and Scarabaeidae. The other three analysed digestive tracts contained the following volumes of prey: 100% of Lepidoptera (sample from Qala'at al Hosn, Krak des Chevaliers), 100% of Lepidoptera (Talsh'hab), and 95% of Lepidoptera, plus 5% of Auchenorrhyncha (Qala'at al Hosn, under the castle bridge). These results proved a very important role of Lepidoptera in the diet of *M. schreibersii*.

Parasites. Diptera: Nycteribiidae: *Penicillidia dufouri* (Westwood, 1835): Höhle Taubenbrunnen, mittleres Euphrattal (Walter & Ebenau 1997); *Penicillidia conspicua* Speiser, 1901: Höhle Taubenbrunnen, mittleres Euphrattal (Walter & Ebenau 1997).

Tadarida teniotis (Rafinesque, 1814)

Records. **Original data**: Al Lathiqiyeh: Qala'at Salah ad Din [1], gorge under the castle, 14 October 2004: repeatedly det. min. 1 ind. – Deir ez Zur: Ayyash [2], dry wadi, 19 May 2001: det. min. 4 inds. – Der'a: Talsh'hab [3], Al Yarmuk Valley, 25 May 2001: det. min. 2 inds. – Dimashq: As'sahl [4], 28 May 2001: det. min. 2 inds.; – Bloudan [5], mountain range above the town, 5 May 2001: det. & obs. min. 1 flying ind.; – Dimashq [6], city, 31 October 2004: det. min. 1 ind.; – Maalula [7], village, 3 October 2004: repeatedly det. 1 ind.; – Yabroud [8], escarpment above the town, 26 June 1998: obs. & det. 1 ind.; 4 and 5 October 2004: net. 1 fa, 5 colonies were found throughout caves, one of ca. 30 inds. – Homs: Tadmor [9], palmeria, 6 and 7 October 2004: repeatedly det. several inds.; – Qala'at al Hosn [10], ruins of Krak des Chevaliers, 1 May 2001: 1 ind. from *Tyto alba* pellet; 18 October 2004: repeatedly det. min. 1 ind. – Raqqa: Kisret Mhamadali [11], rocky cliff, 28 June 1998: 1 ind. from *Tyto alba* pellet (Fig. 161); – Raqqa [12], 8–9th century Islamic settlement at mouth of the Nahr al Balikh River into the Euphrates River, 1 ind. (mandible fragment). – Tartus: Qala'at al Marqab [13], castle ruins, 16 October 2004: repeatedly det. min. 1 ind. – **Published data**: Quneitra / Golan Heights: Golan Heights and Mount Hermon, three unidentified records mapped in central and northern parts of this region [roughly the areas of Mount Hermon, Mas'adah and Ahi'am] (Mendelssohn & Yom-Tov 1999).

Distribution. **General**. *Tadarida teniotis* is a species with a Mediterranean type of distribution (Corbet 1978, Koopman 1994, Horáček et al. 2000). It occurs in North Africa from the Canary Islands and Madeira over the Maghreb, Cyrenaica and northern Egypt, in southern Europe from Iberia over southern France, Italy, and Dalmatia to the Balkans (including most Mediterranean islands) and Crimea, northernmost records coming from Switzerland, southern Germany, central Bosnia and central Bulgaria. In Asia, *T. teniotis* inhabits the Near East from Asia Minor and Transcaucasia to western Saudi Arabia, Iran, Central Asia and Afghanistan (Meyer-Oehme 1965, Kock & Nader 1984, Harrison & Bates 1991, Horáček et al. 2000, Ibáñez & Pérez-Jordá 2004, Ciechanowski et al. 2005). The similar Oriental form which occurs in a secluded range from northwestern India to Japan has been regarded a separate species, *T. insignis* (Funakoshi & Kunisaki 2000, see Horáček et al. 2000, Simmons 2005).

Near East. *T. teniotis* occurs in almost the whole Near East except for southern desert regions (Harrison & Bates 1991, Benda & Horáček 1998). In the Near East, it reaches southern margin of its distribution range both in western Saudi Arabia and southern Iran.

T. teniotis inhabits the entire territory of Turkey (Benda & Horáček 1998), its records cover almost whole Anatolia, both in the Mediterranean and arid steppe regions (Lewis & Harrison 1962, von Lehmann 1966, Corbet & Morris 1967, von Helversen 1989, Albayrak 1990a, Obuch 1994, Benda & Horáček 1998, Karataş et al. 2006, Karataş & Sachanowicz in press). This species has been reported twice from Lebanon, both record sites are situated in a rather higher altitude; the Natural Bridge near Faraya (Lewis & Harrison 1962) and Ba'albek (Kock & Nader 1984).

T. teniotis is a widely distributed species in Palestine (Yom-Tov & Kadmon 1998), it has been found throughout the country, including the Hula and Jordan Valleys, the Coastal Plains, hilly inland of the Galilee and Judea as well as the Negev and the Arava Valley (Tristram 1884, Schmiedenknecht 1906, Anciaux de Faveaux 1953, Theodor & Moscona 1954, Bodenheimer 1958, Harrison 1964a, Makin 1977, 1979, 1987, Qumsiyeh 1985, Mendelssohn & Yom-Tov 1999, Korine & Pinshow 2004). In Jordan, this bat has been reported from the western parts of the country adjacent to the Rift Valley – both Mediterranean and arid ones (Qumsiyeh 1980, 1996, Qumsiyeh et al. 1992, Al-Omari et al. 2000, Amr 2000) as well as from the Syrian Desert (Atallah 1967).

Harrison (1956b) reported the only known finding of *T. teniotis* in Iraq, between Ramadi and Habbaniya, Dulaim Liwa. Only a few *T. teniotis* reports come from Iran (Lewis & Harrison 1962, DeBlase 1971, 1980, de Roguin 1988, our unpubl. data), however the records are scattered over the whole country. In the western part of the country this bat has been found at least four times in the Zagros Mts and its southern foothills (Lewis & Harrison 1962, our unpubl. data).

Boye et al. (1990) reported on the possible occurrence of *T. teniotis* in Cyprus. Although this bat was found in the Cairo region of Egypt, it has never been reported from Sinai (Qumsiyeh 1985). The most extreme records of *T. teniotis* in the Near East comes from the western Saudi Arabia, from near Muwailih and Ta'if (Harrison & Bates 1984, 1991).

Syria (Fig. 160). *T. teniotis* is a medium-frequent bat in Syria, 16 records are available from the country (Table 1). In Syria, it was previously known only from the Golan Heights (Mendelssohn & Yom-Tov 1999). From Syria *proper*, this species is here mentioned for the first time. The 'Syria' mentioned by Horáček et al. (2000) refers to our record from the Anti-Lebanon Mts [8], preliminary reported by Benda et al. (1999a).

T. teniotis has been recorded in two different regions of the country, although the records are mostly represented by the echolocation calls. The most of its findings come from the Mediterranean woodland and steppe-maquis zones; three records are available from the Jebel An Nusariyah Mts [1, 10, 13], five records from the Anti-Lebanon Mts [4–8], three from the Golan Heights, incl. Mount Hermon (Mendelssohn & Yom-Tov 1999), and one record from the Al Yarmuk Valley [3]. These findings well connect known distribution of this species in the Levant (Kock & Nader 1984, Qumsiyeh 1996, Benda & Horáček 1998, Mendelssohn & Yom-Tov 1999).

The occurrence of this Mediterranean species in the desert regions of Syria, i.e. the Euphrates Valley [2, 11, 12] and the oasis of Tadmor [9] could seem to be somewhat surprising, although it connects the only known occurrence in Iraq (Harrison 1956b). However, also in other parts of the Near East *T. teniotis* penetrates into desert regions (Atallah 1967, Harrison & Bates 1984, 1991, Qumsiyeh 1985, Qumsiyeh et al. 1992). But these desert and semi-desert habitats represent the ecological and geographical limits of the distribution of *T. teniotis* (cf. Kock & Nader 1984).

FIELD NOTES. Most of the findings of *Tadarida teniotis* in Syria are records of its calls (see Records). The only capture of a living individual of this species as well as the only finding of its roost were made at Yabroud on 4 October 2004 (Fig. 37). Five smaller colonies plus three solitarily roosting individuals were revealed in crevices of cliffs above the town. One of these colonies was composed of 30 individuals, counted when leaving the roost at sunset. An adult female (LAt=63.7 mm, G=31 g) was netted at the entrance of an overhang in the cliff. At this site a number of other species was recorded (*H. savii*, *R. hipposideros*, *P. pipistrellus*, *P. kuhlii*, *P. macrobullaris*) although none of them was noticed to share the same roost with *T. teniotis*.

T. teniotis was detected to be an exceptional item in owl diet in Syria, similarly as in Turkey and Palestine (Obuch 1994, Obuch unpubl.). Remains of one individual were found in a small sample of *Tyto alba* pellets collected in the castle of Krak des Chevaliers. This only individual represented 0.092% of mammalian and 0.087% of all prey items in the respective sample.

MATERIAL EXAMINED. 1 ind. (ISEA M/11781, M/11782; 1 skull, 1 cochlea, pair of mandibles, from an owl pellet), Kisret Mhamadali, 28 June 1998, leg. A. Shehab; – 1 ind. (NMP 90397; pair of mandibles from an owl pellet), Qala'at al Hosn, 1 May 2001, leg. J. Obuch; – 1 ind. (SMF 90488; mandible fragment), Raqqa, ded. C. Becker.

MORPHOLOGY. See Table 34 for biometric data on the Syrian specimens of *Tadarida teniotis*. The skull of *T. teniotis* found in an owl pellet in the cliff at Kisret Mhamadali is shown in Fig. 161.

TAXONOMY. The recently restricted species rank of *Tadarida teniotis* (sensu Simmons 2005) is composed of one or two subspecies occurring in the western Palaearctic. Some authors consider the species (in its present status) to be monotypic, with the nominotypical form, *T. t. teniotis* (Rafinesque, 1814) (terra typica: 'Sicile' [= Sicily, Italy], Rafinesque-Schmaltz 1814), inhabiting the

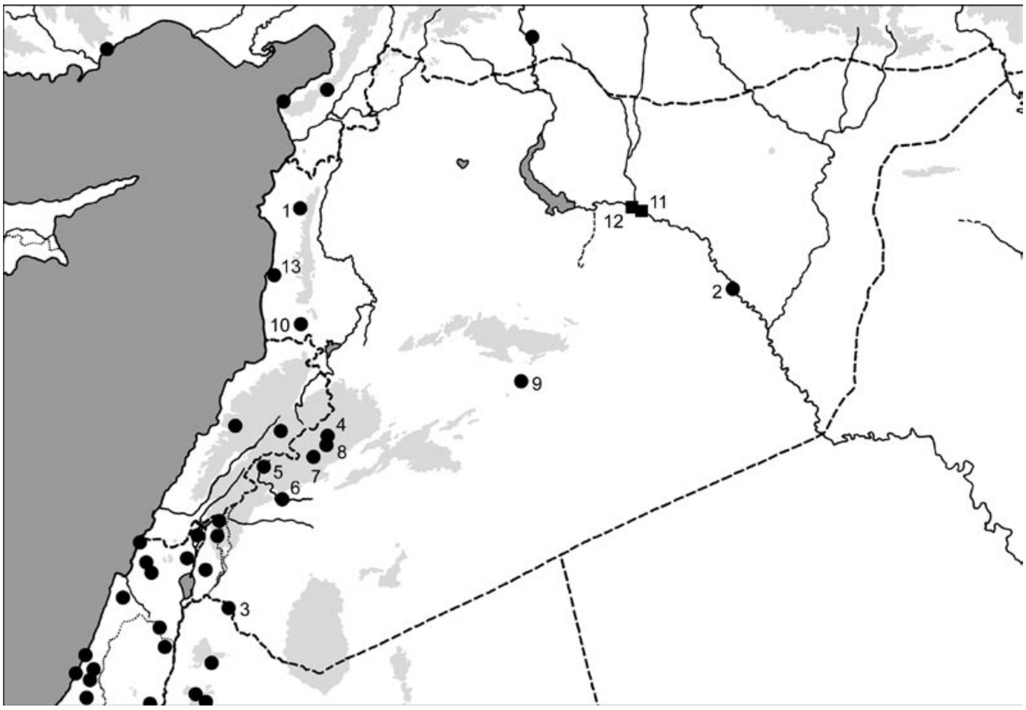

Fig. 160. Records of *Tadarida teniotis* (Rafinesque, 1814) in Syria and surrounding areas. Squares, osteological finds; circles, all other records.

whole distribution range (Corbet 1978, Koopman 1994, cf. Aellen 1966). However, most authors distinguish another subspecies, *T. t. rueppellii* (Temminck, 1826) (t.t.: 'Egypt' given by Temminck 1826; restricted to 'Cairo, Egypt' by Qumsiyeh 1985), distributed in southern and eastern parts of the species range (Ellerman & Morrison-Scott 1951, Sanborn & Hoogstraal 1955, Lewis & Harrison 1962, Harrison 1964a, Hill 1964, Atallah 1967, 1977, Hayman & Hill 1971, DeBlase 1980, Qumsiyeh 1980, 1985, Waring Freeman 1981, Qumsiyeh & Schlitter 1982, Kock & Nader 1984, Nader 1990, Harrison & Bates 1991, Qumsiyeh et al. 1992, Mendelssohn & Yom-Tov 1999, Ferguson 2002, Ibáñez & Pérez-Jordá 2004, Simmons 2005).

Since the metric variation within *T. teniotis* is inconsiderable (Table 34; Lewis & Harrison 1962, Harrison 1964a), only coloration traits are regarded to be valuable for distinction of the two subspecies. The pelage colour in *T. t. rueppellii* is referred to be paler and greyer than in the darker and brownish nominotypical form (Lewis & Harrison 1962, Harrison 1964a, von Lehmann 1966, Harrison & Bates 1991, Ibáñez & Pérez-Jordá 2004). However, the coloration in *T. teniotis* is highly variable throughout the western Palaearctic (Kuzjakin 1965, Arlettaz 1990, Ibáñez & Pérez-Jordá 2004, our data) and assignation of a population to a particular subspecies could be therefore problematic (see e.g. Meyer-Oehme 1965, Aellen 1966, Qumsiyeh 1985, Bates & Harrison 1997).

Although Lewis & Harrison (1962) ascribed the populations of Asia Minor to *T. t. rueppellii* on the basis of one examined specimen from Erzurum, northeastern Anatolia, von Lehmann (1966) found only *T. t. teniotis* at Birecik, southeastern Anatolia (this statement was, however, not accepted by subsequent authors, see Kock & Nader 1984 or Harrison & Bates 1991). Similarly, Hill (1964), Hayman & Hill (1971), Anciaux de Faveaux (1976), Atallah (1977), and Qumsiyeh & Schlitter (1982) assigned the North African populations to *T. t. rueppellii*, but Kock & Nader (1984) and Kock (1987) classified the Maghrebian populations to the nominotypical subspecies and restricted the range of the form *rueppellii* to Egypt and the Middle East. Due to these incongruities as well as the little geographic variation in size (see above), Qumsiyeh (1985) suggested that "it is possible that *rueppellii* is consubspecific with the nominate subspecies". Also Horáček et al. (2000) considered taxonomic status of the form *rueppellii* uncertain.

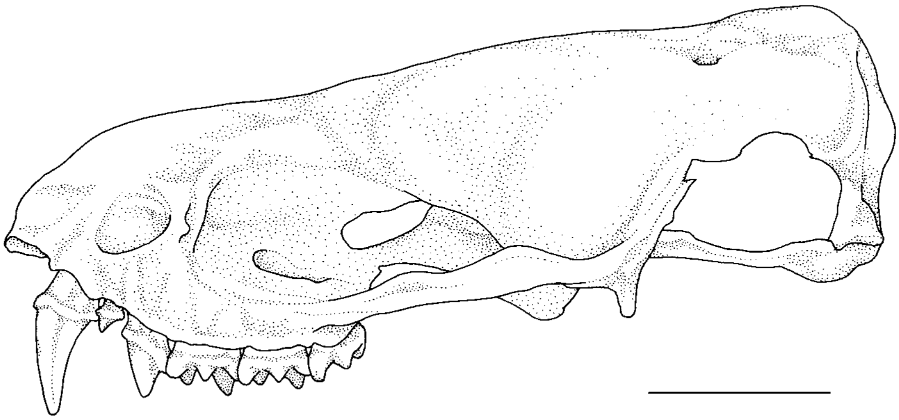

Fig. 161. Skull of *Tadarida teniotis* (Rafinesque, 1814) from Syria (ISEA M/11781, Kisret Mhamadali). Scale bar = 5 mm.

Table 34. Basic biometric data on examined Syrian and comparative samples of *Tadarida teniotis* (Rafinesque, 1814). For abbreviations see pp. 10, 11

	Syria					Turkey & Caucasus					Iran				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	1	**63.7**	–	–	–	6	**62.12**	60.7	64.0	1.130	11	**61.31**	57.9	63.1	1.628
LCr	1	**23.97**	–	–	–	4	**24.21**	23.68	24.62	0.397	11	**24.03**	23.56	24.56	0.297
LCb	1	**23.38**	–	–	–	4	**23.60**	23.48	23.71	0.098	10	**23.44**	23.02	24.02	0.319
LaZ	1	**14.26**	–	–	–	4	**14.30**	14.12	14.47	0.154	11	**14.21**	13.87	14.47	0.240
LaI	1	**5.12**	–	–	–	4	**4.58**	4.53	4.66	0.059	11	**4.64**	4.39	4.77	0.129
LaN	1	**11.57**	–	–	–	4	**12.18**	11.75	12.37	0.289	11	**11.92**	11.58	12.26	0.201
ANc	1	**7.22**	–	–	–	4	**7.39**	7.28	7.48	0.085	10	**7.27**	6.93	7.57	0.231
CC	0	–	–	–	–	5	**5.76**	5.72	5.91	0.082	11	**5.71**	5.49	5.93	0.162
M^3M^3	1	**9.35**	–	–	–	5	**9.45**	9.11	9.67	0.259	11	**9.50**	9.23	9.75	0.182
CM^3	1	**9.07**	–	–	–	6	**9.11**	8.86	9.46	0.236	11	**9.07**	8.81	9.61	0.233
LMd	2	**16.89**	16.84	16.93	0.064	6	**17.20**	16.91	17.52	0.240	11	**17.01**	16.73	17.44	0.267
ACo	1	**4.21**	–	–	–	6	**4.20**	4.02	4.43	0.184	11	**4.05**	3.81	4.23	0.148
CM_3	0	–	–	–	–	6	**9.72**	9.42	10.04	0.241	11	**9.77**	9.50	10.41	0.257
	France					S Europe (Kock & Nader 1984)					Maghreb				
	n					n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	0	–				20	**60.65**	58.0	64.0	1.387	5	**61.22**	60.0	63.7	1.561
LCr	1	24.48				18	**24.12**	23.50	24.90	0.427	6	**23.93**	23.74	24.11	0.157
LCb	1	23.67				19	**23.37**	22.80	24.20	0.414	6	**23.32**	23.13	23.54	0.153
LaZ	1	14.28				19	**14.09**	13.10	14.70	0.377	6	**14.21**	13.45	14.61	0.421
LaI	1	4.58				19	**4.79**	4.40	5.50	0.263	6	**4.54**	4.43	4.67	0.098
LaN	1	12.02				0	–	–	–	–	6	**11.60**	11.42	11.68	0.107
ANc	1	7.38				0	–	–	–	–	6	**7.34**	7.03	7.52	0.164
CC	1	5.71				0	–	–	–	–	6	**5.79**	5.54	5.92	0.135
M^3M^3	1	9.32				0	–	–	–	–	6	**9.51**	9.14	9.74	0.204
CM^3	1	9.27				20	**8.65**	8.20	8.90	0.179	6	**9.05**	8.87	9.17	0.109
LMd	1	16.85				18	**17.18**	16.70	18.00	0.386	6	**16.93**	16.71	17.38	0.256
ACo	1	4.21				0	–	–	–	–	6	**4.17**	3.98	4.32	0.133
CM_3	1	9.87				20	**9.51**	9.00	9.90	0.220	6	**9.67**	9.44	9.77	0.137

As we examined only skeletal remnants of the Syrian populations, we can hardly contribute to the clarification of subspecific variation based on coloration traits. However, both currently accepted subspecies could meet in Syria, as the status of Turkish and Iran populations is not clear (see Kumerloeve 1975a, DeBlase 1980, Benda & Horáček 1998). Kock (1987) suggested *T. t. teniotis* to be slightly larger than *T. t. rueppellii*, and based on this difference, he assigned Moroccan bats examined by him to the nominotypical form. As the limited material from Syria does not show any substantial size difference from comparation samples of the northern and western Mediterranean (Table 34), we tentatively consider the Syrian populations to belong rather to *T. t. teniotis*. The coloration of bats briefly observed in Yabroud [8] supports such identification.

FEEDING ECOLOGY. *Tadarida teniotis* is a large fast flying aerial hawker that hunts in an open air space (Norberg & Rayner 1987, Arlettaz 1990, Feldman et al. 2000). Lepidoptera were found to be the most important prey category. Other taxa frequently found in its diet are Neuroptera, Coleoptera and Gryllidae (Rydell & Arlettaz 1994, Whitaker et al. 1994).

From Syria, we analysed one sample of faeces of *T. teniotis* collected at Yabroud. We found Lepidoptera to be a dominant diet item (95% of volume), the rest was composed of Gryllidae

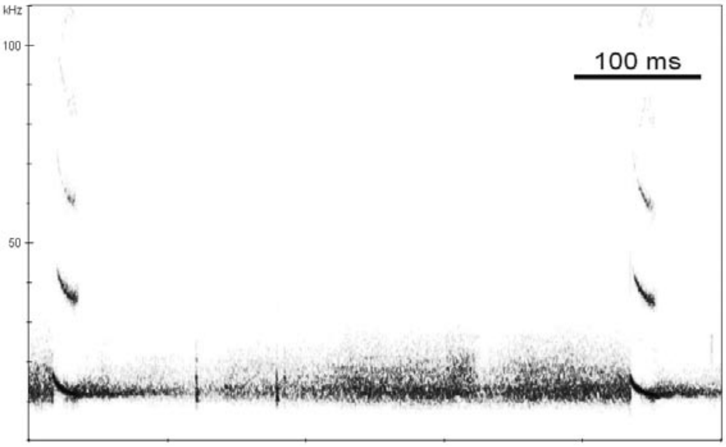

Fig. 162. Spectrogram of echolocation calls of *Tadarida teniotis* (Rafinesque, 1814). An individual foraging above the town of Maalula.

(3%), Heteroptera (1.5%) and Carabidae (0.5%). These results correspond well with the results obtained in previous analyses and confirmed Lepidoptera to be the most important prey category in *T. teniotis*.

Echolocation. Acoustic recordings of *Tadarida teniotis* were obtained from four localities in Syria: Maalula (3 October 2004; Fig. 162), Tadmor (6 October 2004; Fig. 139), Qala'at al Hosn (18 October 2004), and Yabroud (4 October 2004). However, typical echolocation calls of the species (audible even without a bat detector) were recorded at many more sites (see the Records). Results of echolocation analyses are given in Table 15.

Echolocation parameters of Syrian *T. teniotis* fall within the range described for European populations (Zbinden & Zingg 1986, Zingg 1990, Rydell & Arlettaz 1994, Russo & Jones 2002, Obrist et al. 2004). Due to very typical echolocation calls, audible even for an unequipped human ear, the species could be easily recorded at any place of its occurrence.

Bats in owl diet

Several authors have studied composition of the owl diet in Syria (Nader & Kock 1983c, Kock et al. 1994, Ebenau 1994, 1996, Shehab 2004, 2005, Shehab et al. 2000, 2004), besides that there are some systematic papers mentioning several mammalian species contained in the pellets (see e.g. Shehab 2005 for a review). However, Nader & Kock (1983c), Ebenau (1994, 1996) and Shehab et al. (2004) reported some findings of bat remains in the diet of the only owl species, *Tyto alba* (see List of species).

We collected owl pellets in Syria during field trips in 1995, 1998, 2001 and 2005 (Table 35). From that material, only the amounts gathered in 1998 and 2001 were partly processed, and the proportions of hedgehogs and dormice were evaluated (Benda & Obuch 2001, Obuch 2001). The diet composition of *Athene noctua* was published separately (Obuch & Krištín 2004).

We detected remains of bats in the diet of five owl species in Syria; *Tyto alba* (Scopoli, 1769), *Bubo bubo* (Linnaeus, 1758), *Athene noctua* (Scopoli, 1769), *Asio otus* (Linnaeus, 1758) and *Strix aluco* Linnaeus, 1758. In the diet of these owl species (Table 35), we found 26,908 prey items, out of which the proportion of bats was relatively high: 2,092 individuals (7.77%). In the diet of *T. alba* we found (1) the highest number of samples comprising bats, and (2) the highest proportion of bats per sample; out of the total number of 22,078 prey items, 2,057 items represented bats (9.32%).

In the diet of the other owl species, the proportions of bats mostly exceed 1%, although the samples were relatively much smaller than from *T. alba*: *S. aluco* 1.63%, *A. otus* 2.37%, *B. bubo* 1.03%. The very low proportion of bats found in the diet of *A. noctua* (0.18%) is mainly an effect of the relatively high percentage of invertebrates (87%) in its diet remnants (Obuch & Krištín 2004).

The samples of *T. alba* diet with a higher proportion of bats (Table 35) come particularly from the areas in or adjacent to the Euphrates Valley. In the ruins of Rasafah, we found a higher proportion of bats in the pellets collected in the huge underground cistern (9.09 and 9.52%) than in the pellets collected in the ruined walls of the city (1.05 and 3.23%). The composition and proportions of bat species found in the pellets from the cistern are similar to the results of nettings at the cistern openings during repeated visits of the site. It seems that the barn owl living in the ruins or right in the cistern (one individual was observed and also netted there) is specialised on hunting bats emerging from or swarming close to the underground openings.

In ruins of the fortress cities of Halabiyyeh and Zalabiyyeh situated close to each other on opposite banks of the Euphrates (Fig. 163), we found samples of *T. alba* pellets containinig a slightly

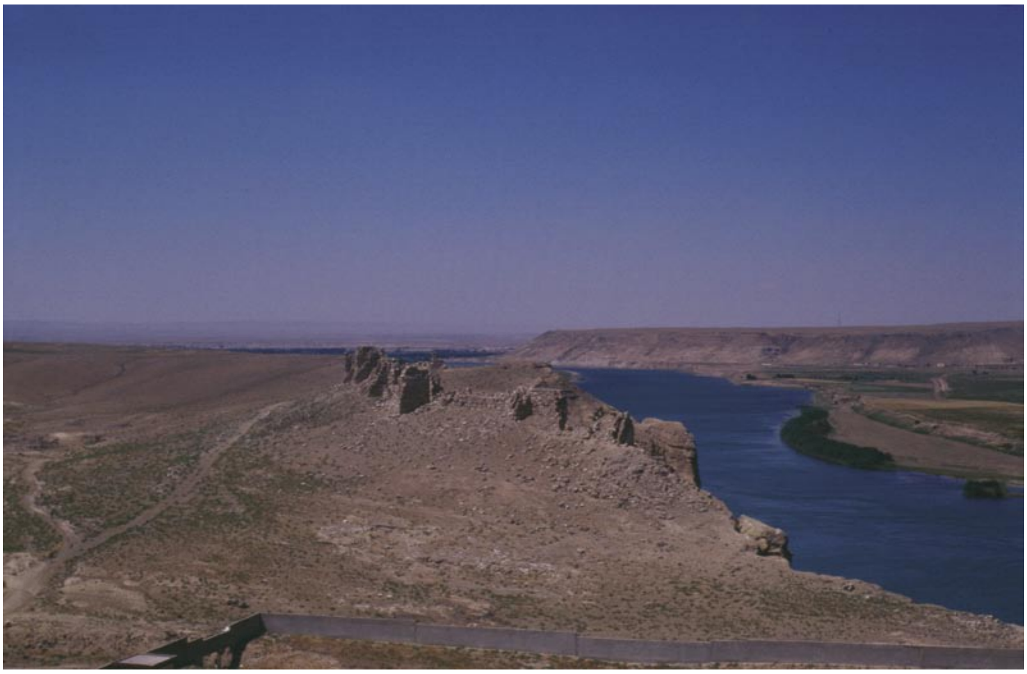

Fig. 163. Ruins of ancient Zalabiyyeh above the Euphrates river (near Halabiyyeh, in the background across the river). The area where remains of *Taphozous nudiventris*, *Asellia tridens*, *Eptesicus bottae*, *Pipistrellus kuhlii*, and *Otonycteris hemprichii* were found in pellets of *Tyto alba* (photo by A. Reiter).

Table 35. Presence of bat remains in the owl pellets from Syria. Explanation: year = year of the sample collection (for exact date see the material examined), B = bat items, M = mammalian items, P = whole prey items; species acronyms: *Tn* = *Taphozous nudiventris*, *At* = *Asellia tridens*, *Rf* = *Rhinolophus ferrumequinum*, *Rm* = *Rhinolophus mehelyi*, *Mb* = *Myotis blythii*, *Me* = *Myotis emarginatus*, *Mc* = *Myotis capaccinii*, *Es* = *Eptesicus serotinus*, *Eb* = *Eptesicus bottae*, *Pp* = *Pipistrellus pipistrellus*, *Pk* = *Pipistrellus kuhlii*, *Oh* = *Otonycteris hemprichii*, *Tt* = *Tadarida teniotis*

sample	year	*Tn*	*At*	*Rf*	*Rm*	*Mb*	*Me*	*Mc*	*Es*	*Eb*	*Pp*	*Pk*	*Oh*	*Tt*	Σ B	Σ M	Σ P	% M	% P
Tyto alba																			
Mashta Deir Mama	2001	–	–	–	–	–	–	–	–	–	–	1	–	–	1	448	461	0.22	0.22
Qala’at al Hosn	2001	–	–	–	–	–	–	–	–	–	–	–	–	1	1	1091	1150	0.09	0.09
Qala’at Sheisar	2001	–	–	–	–	–	–	–	–	–	–	3	–	–	3	568	772	0.53	0.39
Bosra	2001	–	–	–	–	–	–	–	–	–	–	14	–	–	14	243	491	5.76	2.85
Hassake	1998	–	–	–	–	–	–	–	–	–	–	1	–	–	1	417	456	0.24	0.22
Halabiyyeh. ruins	1995	–	–	–	–	–	–	–	–	–	–	1	1	–	2	1757	1860	0.11	0.11
Rasafah, city walls	1998	–	–	–	–	–	–	–	–	–	–	9	4	–	13	1174	1241	1.11	1.05
Rasafah, city walls	2001	–	–	–	–	–	–	–	–	–	–	22	1	–	23	603	711	3.81	3.23
Rasafah, cistern	1998	–	–	–	–	–	–	–	–	5	–	14	–	–	19	176	209	10.80	9.09
Rasafah, cistern	2001	–	–	–	–	–	–	–	–	11	–	25	6	–	42	363	441	11.57	9.52
Al Bas’ah	1998	–	–	–	–	–	–	–	–	–	–	1	–	–	1	227	279	0.44	0.36
Halabiyyeh, ruins	1998	7	3	–	–	–	–	12	–	–	–	127	3	–	152	1394	1565	10.90	9.71
Halabiyyeh, ruins	2001	15	17	–	1	–	–	19	1	–	–	198	13	–	264	1698	1860	15.55	14.19
Zalabiyyeh	2001	10	3	–	–	–	–	–	–	1	–	150	4	–	168	988	1177	17.00	14.27
Qala’at ar Rahba	2001	–	–	–	–	–	–	–	–	–	–	29	10	–	39	284	301	13.73	12.96
As Salihiyyah, 2 km NW	2001	–	1	–	–	–	–	–	–	–	–	59	–	–	60	884	1173	6.79	5.12
As Salihiyyah	1998	1	5	–	–	–	–	–	–	–	–	135	6	–	147	2211	2596	6.65	5.66
As Salihiyyah	2001	–	6	2	–	–	–	2	6	1	–	1064	7	–	1088	2736	3312	39.77	32.85
Mari, excavations	1998	–	–	–	–	–	–	–	–	–	–	6	–	–	6	41	55	14.63	10.91
Mari, excavations	2001	–	–	–	–	–	–	–	–	–	–	7	–	–	7	14	18	50.00	38.89
Marshadeh	2001	–	–	–	–	–	–	–	–	–	–	6	–	–	6	285	307	2.11	1.95
total *T. alba*		33	35	2	1	0	0	33	7	18	0	1872	55	1	2057	19097	22078	10.77	9.32
Bubo bubo																			
Tadmor, 5 km to W	1998	–	1	–	–	–	–	–	–	–	–	–	–	–	1	149	184	0.67	0.54
Tadmor, 5 km to W	2001	–	2	–	–	–	–	–	–	–	–	–	–	–	2	73	101	2.74	1.98
total *B. bubo*		0	3	0	0	0	0	0	0	0	0	0	0	0	3	224	291	1.34	1.03

Table 35. (continued)

sample	year	*Tn*	*At*	*Rf*	*Rm*	*Mb*	*Me*	*Mc*	*Es*	*Eb*	*Pp*	*Pk*	*Oh*	*Tt*	Σ B	Σ M	Σ P	% M	% P
Asio otus																			
Tadmor, oasis	1998	–	1	–	–	–	–	–	–	–	–	–	–	–	1	55	165	1.82	0.61
Tadmor, oasis	2001	–	5	–	–	–	–	–	–	–	–	1	–	–	6	164	283	3.66	2.12
Tadmor, oasis	2005	–	7	–	–	–	–	–	–	–	–	5	–	–	12	166	327	7.23	3.67
Hassake	1998	–	–	–	–	–	–	–	–	–	–	1	–	–	1	7	24	14.29	4.17
total *A. otus*		0	13	0	0	0	0	0	0	0	0	7	0	0	20	417	843	4.80	2.37
Athene noctua																			
Rasafah, city walls	2001	–	–	–	–	–	–	–	–	–	–	1	–	–	1	3	569	33.33	0.18
Tell Sheikh Hamad	2001	–	–	–	–	–	–	–	–	–	–	1	–	–	1	23	164	4.35	0.61
Mari, excavations	1998	–	–	–	–	–	–	–	–	–	–	3	–	–	3	19	85	15.79	3.53
Qasr Ibn Wardan	2005	–	–	–	–	–	–	–	–	–	–	1	–	–	1	7	195	14.29	0.51
total *A. noctua*		0	0	0	0	0	0	0	0	0	0	6	0	0	6	248	3327	2.42	0.18
Strix aluco																			
Qala'at Salah ad Din	2001	–	–	–	–	1	–	–	–	–	–	–	–	–	1	100	158	1.00	0.63
Ar Rawda, pine forest	1998	–	–	–	–	–	1	–	–	–	1	–	–	–	2	59	67	3.39	2.99
Ar Rawda, pine forest	2001	–	–	–	–	–	–	–	–	–	–	3	–	–	3	83	144	3.61	2.08
total *S. aluco*		0	0	0	0	1	1	0	0	0	1	3	0	0	6	242	369	2.48	1.63
total owls		33	51	2	1	1	1	33	7	18	1	1888	55	1	2092	20228	26908	10.34	7.77

in the total numbers per owl species, also the samples which does not contain bats were counted different bat species composition (Table 35). *P. kuhlii* was the dominant bat species similarly as at the previous site, however, numerous occurrence was found also in *T. nudiventris*, *A. tridens*, *M. capaccinii*, and *O. hemprichii*. The significant dominance of *P. kuhlii* among bats (87.22% in mean) is apparent in the samples from the lower part of the Euphrates in Syria. In the sample collected in gypsum walls above the river at As Salihiyyah on 19 April 2001, bats represented almost one third of prey items (32.85%).

A slightly different composition of bat species was found in the diet of the other owl species (Table 35). In *A. noctua* diet, only *P. kuhlii* was detected, in the diet of *A. otus* from the oasis of Tadmor, *A. tridens* represented the main part of bat remains, and in *S. aluco* diet from the Mediterranean region of Syria, also *M. blythii*, *M. emarginatus* and *Pipistrellus pipistrellus* were present.

The higher representation of bats in the diet of *T. alba* has been found also at several sites in Central Europe (Bauer 1956b, Obuch 1998). A rich proportion of bats has been detected also in various samples of the diet of *S. aluco* from karst regions of Europe and Middle East (Obuch 1992, 1994, Obuch & Benda 1996). The percentage of bats in the samples of *A. otus* diet from Syria is significantly higher than in the analysed pellets of this species from some European countries (comp. Obuch 1989).

DISCUSSION AND CONCLUSIONS

Fauna

The present review summarises 290* records of 27 bat species available from Syria *sensu stricto* and 24 species in Syria *proper* (Tables 1, 36). Such number is at least three times higher than that mentioned in the first review of Syrian bats by Harrison (1964a); the last review of Arabian mammals (Harrison & Bates 1991) reported 10 species of bats in Syria, i.e. 37% of the presently known ammount (Table 36).

For Syria *proper*, five bat species are reported here for the first time: *Rhinolophus hipposideros*, *Myotis nattereri*, *Hypsugo savii*, *Nyctalus noctula*, and *Tadarida teniotis*. Another bat species, *Eptesicus anatolicus*, reported here for the first time from the whole Syrian territory, was formerly considered to be a subspecies of *E. bottae* (known to live also in Syria) and here it has been raised to the species level.

Out of the fauna of the Near East, which comprises of 58 bat species (if also the complete fauna of Iran as well as the northern elements of the Turkish fauna are taken into account), 46.6% are distributed also in Syria (Table 36). However, when only the bats inhabiting the western part of the Near East are taken in account (42 species), the known Syrian fauna represents 64.3% of them.

Nevertheless, even the present faunal list of Syrian bats may still be incomplete, as several other species might be expected in the country. The potential members of the Syrian fauna can be divided into two groups; (1) the southern, mostly desert elements, occurring either in the Rift Valley or in Mesopotamia (or in both regions), and (2) the northern, rather Mediterranean elements, inhabiting southern Turkey, Cyprus and the northern corner of Iraq. These elements represent up to 13 species which potentially might enrich the Syrian bat fauna, if an adequate survey is carried out in the critical regions.

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* NOTE ADDED IN PROOF. Just recently, Shehab & Mamkhair (2006) published additional records of *Rhinolophus ferrumequinum* and *R. euryale* from the castle of Qala'at Salah ad Din made in September 2004. These findings most probably represents records of the same colonies as we registered there in June 1998 and October 2004. Additionally, Shehab et al. (2006b) mentioned findings of *R. hipposideros* from two sites in western Syria, which represent first published records of this species from the Syria *proper*.

Several bat species of the group (1) are distributed in the Levantine part of the Rift Valley, most of them mainly in the Arava Valley. However, the distribution range of several of them extends as far northwards as to Lake Tiberias. Thus, these species can be expected particularly in the Golan Heights and in the Syrian part of the Hula Valley, similarly as it was proved e.g., for the genera *Rhinopoma* or *Asellia* (Figs. 10, 50). *Taphozous perforatus* Geoffroy, 1818 is a species relatively rarely found in the region, first Levantine records have been published only recently, originating from the Dead Sea valley (Yom-Tov & Shalmon 1989, Qumsiyeh et al. 1992). However, a new record is known from Nahal ‘Ammud, i.e. the Palestinian area adjacent to Lake Tiberias (Mendelssohn & Yom-Tov 1999). Similarly, *Nycteris thebaica* Geoffroy, 1818 is a bat species occurring throughout the Levantine part of the Rift Valley (Nader & Kock 1983a), 11 records are known from the Palestinian part of the Valley (Mendelssohn & Yom-Tov 1999), one from Jordan (Al-Omari et al. 2000). The northernmost record in the Near East (as well as in the Palaearctic) comes from the northwestern bank of Lake Tiberias (Mendelssohn & Yom-Tov 1999). *Pipistrellus rueppellii* (Fischer, 1829) is another faunal element of the same type; it has been recorded several times in Palestine, at least once near Haifa (Tristram 1884, Mendelssohn & Yom-Tov 1999) (these records perhaps include different ones than only the uncertain one published by Tristram 1884 as *Scotophilus temminkii* [sic] from “under Mount Carmel on the plain of Acre”, see also Harrison & Bates 1991). However, *P. rueppellii* has been recorded also in Iraqi Mesopotamia (Thomas 1919, Cheesman 1920, Nader 1971) and thus, it is likely to be found also in Syrian portion of the Euphrates Valley. In Lower Mesopotamia, also *Eptesicus nasutus* (Dobson, 1877) is present (Thomas 1905, 1919, Sanborn 1940, Harrison 1956a, DeBlase 1971, 1980, Nader 1971) and its finding in Middle Mesopotamia of Syria is possible. Additionally, three desert bat species are distributed in the Arava Valley; viz., *Rhinolophus clivosus* Cretzschmar, 1828, *Hypsugo ariel* (Thomas, 1904) (incl. *H. bodenheimeri* Harrison, 1960) and *Barbastella leucomelas* (Cretzschmar, 1826). However, the northern limits of their known distribution ranges lie in the Dead Sea region (Mendelssohn & Yom-Tov 1999, Amr et al. 2004) and the occurrence of these species in Syria seems rather unlikely.

Concerning the group (2) of the ‘northern’ species, *Plecotus* ‘*t.*’ *kolombatovici* Đulić, 1980 certainly is the bat with the most probable occurrence in Syria. It has been found on the shore of the Turkish province of Hatay, ca. 17 km from the Syrian border (Benda & Ivanova 2003, Benda et al. 2004c), in habitats continuing along the sea coast from Turkey to Syria (more data on this species are under *Plecotus macrobullaris* chapter in the List of species). Several bat species have their easternmost spot of occurrence in the eastern Mediterranean in Cyprus (Table 36), namely *Pipistrellus pygmaeus* (Leach, 1825) (Hanák et al. 2001, Stadelmann et al. 2004, Hulva et al. 2004), *Nyctalus leisleri* (Kuhl, 1817) and *N. lasiopterus* (Schreber, 1780) (our unpubl. data), the latter two species are present also in Cyrenaica, Libya (Spitzenberger 1982, Qumsiyeh & Schlitter 1982, Hanák & Elgadi 1984). However, the occurrence of *P. pygmaeus* and *N. lasiopterus* in Cyprus appears to be rather isolated as the closest distribution of these species is known in the Aegean region including the northwestern corner of Anatolia (Kahmann 1962, Hanák et al. 2001, Dietz et al. 2005), and their eventual appearance in Syria would be quite surprising. On the other hand, *N. leisleri* is known to inhabit a large part of Anatolia including the southwestern and northern parts as well as northern and central Iran (Neuhauser & DeBlase 1974, DeBlase 1980, von Helversen 1989, Steiner & Gaisler 1994, Benda & Horáček 1998, Albayrak 2003) and also, it represents a typical migratory bat species (Strelkov 1969, 1971a, Hutterer et al. 2005). Its record in the forested regions of the northwestern part of Mediterranean Syria is thus well possible.

Other ‘northern’ elements in the fauna of the Near East, which might be encountered in Syria, include *Myotis bechsteinii* (Kuhl, 1817), *M. tschuliensis* Kusjakin, 1935, or some taxa of the *M. mystacinus* group. (For comments on distribution of the latter two, see *Myotis nattereri*

Table 36. List of bat species of the Near East with marked faunal status per individual countries (based on the reviews of distribution throughout the List of Species, literature sources [see References] and authors' unpublished data). Explanation of the symbols: + = occurrence confirmed and published; × = occurrence confirmed but unpublished yet (authors' data); # = occurrence in Syria first mentioned in the present paper; – = occurrence unconfirmed; the state in parentheses is doubtful (see text). Explanation of geographical acronyms: TR = Turkey; SE TR = territories of the Turkish provinces close to the border with Syria: Adana, Hatay, Gaziantep, Şanli Urfa, and Mardin (according to the state summarised by Benda & Horáček 1998, complemeted by Sachanowicz et al. 1999); CY = Cyprus; LB = Lebanon; PA = Palestine; JO = Jordan; IQ = Iraq; IN = Iran; SY = Syria *sensu stricto*; SP = Syria *proper*

species	TR	SE TR	CY	LB	PA	JO	IQ	IN	SY	SP
Rousettus aegyptiacus	+	+	+	+	+	+	–	+	+	+
Rhinopoma microphyllum	–	–	–	+	+	+	+	+	+	–
Rhinopoma hardwickii	–	–	–	–	+	+	+	+	+	–
Rhinopoma muscatellum	–	–	–	–	–	–	–	+	–	–
Taphozous nudiventris	+	+	–	–	+	+	+	+	+	+
Taphozous perforatus	–	–	–	–	+	+	–	+	–	–
Nycteris thebaica	–	–	–	–	+	+	–	–	–	–
Rhinolophus ferrumequinum	+	+	+	+	+	+	+	+	+	+
Rhinolophus clivosus	–	–	–	–	+	+	–	–	–	–
Rhinolophus bocharicus	–	–	–	–	–	–	–	+	–	–
Rhinolophus hipposideros	+	+	+	+	+	+	+	+	+	#
Rhinolophus euryale	+	+	(+)	+	+	+	–	+	+	+
Rhinolophus mehelyi	+	+	+	–	+	+	+	+	+	+
Rhinolophus blasii	+	+	+	–	+	+	–	+	+	+
Asellia tridens	–	–	–	–	+	+	+	+	+	+
Triaenops persicus	–	–	–	–	–	–	–	+	–	–
Myotis myotis	+	+	–	+	+	–	–	–	+	+
Myotis blythii	+	+	+	+	+	–	+	+	+	+
Myotis bechsteinii	+	–	–	–	–	–	–	+	–	–
Myotis nattereri	+	+	+	+	+	+	–	×	+	#
Myotis tschuliensis	+	–	–	–	–	–	+	–	–	–
Myotis schaubi	–	–	–	–	–	–	–	+	–	–
Myotis emarginatus	+	+	+	+	+	+	(–)	+	+	+
Myotis brandtii	+	–	–	–	–	–	–	–	–	–
Myotis mystacinus	+	(+)	–	–	–	–	–	(+)	–	–
Myotis aurascens	+	–	–	×	–	–	–	+	+	–
Myotis nipalensis	+	–	–	–	–	–	–	+	–	–
Myotis daubentonii	+	–	–	–	–	–	–	–	–	–
Myotis capaccinii	+	+	(+)	+	+	+	+	+	+	+
Vespertilio murinus	+	–	–	–	–	–	–	+	–	–
Eptesicus serotinus	+	+	+	+	+	–	–	+	+	+
Eptesicus bottae	–	–	–	–	+	+	+	+	+	+
Eptesicus anatolicus	+	+	×	×	–	–	+	+	#	#
Eptesicus nilssonii s. l.	–	–	–	–	–	–	–	+	–	–
Eptesicus bobrinskoi	–	–	–	–	–	–	–	+	–	–
Eptesicus nasutus	–	–	–	–	–	–	+	+	–	–
Hypsugo savii	+	+	+	+	+	–	–	+	+	#
Hypsugo ariel (= *bodenheimeri*)	–	–	–	–	+	+	–	–	–	–
Hypsugo arabicus	–	–	–	–	–	–	–	×	–	–
Pipistrellus pipistrellus	+	+	×	+	+	(–)	–	+	+	+
Pipistrellus pygmaeus	+	–	+	–	–	–	–	–	–	–
Pipistrellus nathusii	+	–	–	–	–	–	–	–	–	–
Pipistrellus kuhlii	+	+	+	+	+	+	+	+	+	+
Pipistrellus rueppellii	–	–	–	–	+	–	+	–	–	–
Nyctalus noctula	+	+	+	+	+	–	–	+	+	#
Nyctalus leisleri	+	–	×	–	–	–	–	+	–	–
Nyctalus lasiopterus	+	–	×	–	–	–	–	+	–	–

Table 36. (continued)

species	TR	SE TR	CY	LB	PA	JO	IQ	IN	SY	SP
Otonycteris hemprichii	+	+	–	–	+	+	+	+	+	+
Barbastella barbastellus	+	–	–	–	–	–	–	×	–	–
Barbastella leucomelas	–	–	–	–	+	–	–	+	–	–
Plecotus auritus	+	–	–	–	–	–	–	+	–	–
Plecotus macrobullaris	+	–	–	–	–	–	–	+	+	+
Plecotus austriacus	+	–	–	–	–	–	–	–	–	–
Plecotus '*t.*' *kolombatovici*	+	+	×	–	–	–	–	–	–	–
Plecotus cf. *christii*	–	–	–	–	+	+	–	–	–	–
Miniopterus schreibersii	+	+	+	+	+	+	+	+	+	+
Tadarida teniotis	+	+	+	+	+	+	+	+	+	#
Tadarida aegyptiaca	–	–	–	–	–	–	–	+	–	–
Suma per country	38	23	22	19	31	23	18	45	27	24

and *M. aurascens* chapters in the List of species.) The distributional pattern of *M. bechsteinii* in the Near East is very similar to that of *N. leisleri*, except for occurrence of the latter species in Cyprus (DeBlase 1980, von Helversen 1989, Albayrak 1990, 2003, our unpubl. data); however, a possibility of *M. bechsteinii* record in Syria remains rather hypothetical in comparison to other species under discussion.

An aspect which could pontentially affect the knowledge of Syrian bat fauna composition other than the level of intensity of the aerial distribution research should be considered the time. Several species, such as *Rhinolophus mehelyi* or *R. blasii*, are known from findings made roughly a hundred years ago, some others, e.g. *Rousettus aegyptiacus*, *Rhinolophus hipposideros*, *Myotis emarginatus*, or *Tadarida teniotis*, only from the last years. However, for any statement of time dependent changes in the fauna composition and/or faunal percentage proportions, which are well known e.g. from some European regions, seems to be impossible in the case of such insufficiently known region as Syria appears.

Zoogeography

Concerning the general distribution of bat fauna, the territory of Syria comprises two main bioregions; (1) a region of relatively humid woodlands and steppes situated in the Mediterranean western and northwestern parts of the country close to sea shore and along mountain ranges; and (2) a region of arid steppes and semi-deserts in central, southern and eastern parts where the Euphrates valley acts as a 'linear oasis'. Naturally, this geographical division is analogous to that based on plant and vegetation occurrence in the region (see e.g. the review by Palacký 1904) and thus well corresponds with the geobotanical subdivision of the Middle East by Zohary (1973), see Fig. 1 and Table 37. The western bioregion can be co-identified with Zohary's zones of the Mediterranean woodland climax and the Mediterranean steppe-maquis, respectively, while the more extensive eastern arid region with the Mesopotamian steppes and semi-deserts, a part of the Irano-Turanian zone (for vegetation and climate characteristics of the regions see Zohary 1973: 137–151, 168–169).

In relation to these bioregions, there are three chorologic types of bats in Syria (see the distribution maps of particular species above); two types are represented by species which distribution is mostly restricted to just one of the two main bioregions ('Mediterranean' or 'Semi-desert'), while the species of the third faunal type inhabit both bioregions. This pattern was already observed by Harrison (1964a), who found such subregions in a large portion of the northern part of Arabia and named them a zone of 'Boreal Eurasiatic Mammals' and a zone of 'Saharo-Sindian Desert Mammals', respectively. A similar biogeographical break of two bioregions is well noticeable in the faunal patterns of most of the countries of the Near East and has been discussed several times (for those of bat faunas see e.g. Kosswig 1955, Atallah 1978, DeBlase 1980, Qumsiyeh 1985, 1996, Horáček & Benda 1998, etc.).

The first faunal type, group of the 'Mediterranean' bat species, is in Syria represented by *Rousettus aegyptiacus*, *Rhinopoma microphyllum*, *R. hardwickii*, *Rhinolophus hipposideros*, *R. euryale*, *R. blasii*, *Myotis myotis*, *M. blythii*, *M. nattereri*, *M. emarginatus*, *M. aurascens*, *Eptesicus anatolicus*, *Hypsugo savii*, *Pipistrellus pipistrellus*, *Nyctalus noctula*, and *Plecotus macrobullaris*. The second type, the group of the 'Semi-desert' species, comprises *Taphozous nudiventris*, *Asellia tridens*, *Myotis capaccinii*, *Eptesicus bottae*, and *Otonycteris hemprichii*. The third faunal type, species distributed both in the Mediterranean and Semi-desert regions, is represented by *Rhinolophus ferrumequinum*, *R. mehelyi*, *Eptesicus serotinus*, *Pipistrellus kuhlii*, *Miniopterus schreibersii*, and *Tadarida teniotis*. However, most species of the third group (except for *P. kuhlii* and *T. teniotis*) do not seem to be true desert forms and their occurrence in the arid eastern part of Syria is probably due to the effect of the Euphrates. More to the south, in the Syrian Desert these species are not present, while true desert forms of the second group occur throughout deserts of the Middle East (Harrison & Bates 1991).

However, the above mentioned subdivision seems to be slightly arbitrary in some species, being based solely on the comparison of distribution maps. In at least four species, the above suggested affiliations should be thus considered artificial as their Syrian records do not characterise their distribution ranges adequately. Bats of the genus *Rhinopoma* are mainly desert forms generally considered to be the Saharo-Sindian faunal elements in the Middle East (Atallah 1978). Their occurrence in Syria is only a fringe of their distribution range which reaches the Mediterranean also marginally via the Rift Valley, and they certainly could not be considered true Mediterranean species, being present also in desert Mesopotamia (Table 37, Fig. 10). Similarly, although the inclusion of *R. aegyptiacus* among Mediterranean species is fully in accordance with its distribution in the eastern Mediterranean region, it generally represents an Afro-tropical species occurring in Mediterranean habitats only marginally from the perspective of its whole distribution range as well as the total extent of the Mediterranean habitats.

On the other hand, *M. capaccinii* which could be regarded a typical Mediterranean species considering the pattern of its distribution from Iberia and Maghreb through southern Europe to the Near East, which accidentally has not been recorded in the Mediterranean part of Syria, but it inhabits such habitats in Turkey, Lebanon and Palestine (see Fig. 68); this species is thus actually a typical representative of the third group. The group assignments of other species seem to be in good agreement with their distribution characteristics in other countries of the Near East (see the particular distribution chapters).

As stressed in Introduction, and also as it clearly arises from the distribution patterns of the above defined chorologic units, the territory of Syria lies on the transition of two main biomes of the southwestern Palaearctic, the Mediterranean arboreal and the Saharo-Sindian eremial. In Syria, the border between these bioregions stretches along the eastern extents of uplands fringing the Rift Valley from the east, i.e. Golan Heights, Mount Hermon, Anti-Lebanon Mts, and the hilly eastern bank of the Orontes river ('Hills of Homs and Hama' by Atallah 1977), to the east of the Ez Zawiyan Mts, and across the plains around Halab (Aleppo) approximately to the crossing of the Euphrates through the Syrian-Turkish border. Syria thus comprises margins of distribution ranges of many species including bats, both of northern and southern affiliations. Most of the above categorised Mediterranean elements reach their southern distribution limit either in southwestern Syria or in the adjacent regions of northern Palestine and/or Jordan. According to Mendelssohn

Table 37. Occurrence of particular bat species in the vegatation zones of Syria (modified after Zohary 1973, see Fig. 1). In parentheses are marked occurrences out of the Syrian territory but which is expected in the Syrian portion of the respective vegetation zone according to records in the adjacent areas

species	Mediterranean woodland	Rift Valley	Mediterranean steppe-maquis	Mesopotamian steppes & deserts	Syrian Desert
Rousettus aegyptiacus	+	+	–	–	–
Rhinopoma microphyllum	–	+	–	(+)	–
Rhinopoma hardwickii	–	+	–	(+)	–
Taphozous nudiventris	–	(+)	–	+	–
Rhinolophus ferrumequinum	+	+	+	+	(+)
Rhinolophus hipposideros	+	+	+	–	–
Rhinolophus euryale	+	(+)	–	–	–
Rhinolophus mehelyi	+	(+)	+	+	(+)
Rhinolophus blasii	+	(+)	+	–	–
Asellia tridens	–	+	–	+	+
Myotis myotis	+	+	+	–	–
Myotis blythii	+	+	+	–	–
Myotis nattereri	+	+	+	–	–
Myotis emarginatus	+	+	–	–	–
Myotis aurascens	+	+	–	–	–
Myotis capaccinii	(+)	+	+	+	–
Eptesicus serotinus	+	+	+	+	–
Eptesicus bottae	–	–	–	+	–
Eptesicus anatolicus	+	–	+	–	–
Hypsugo savii	+	+	+	–	–
Pipistrellus pipistrellus	+	+	+	–	–
Pipistrellus kuhlii	+	+	+	+	+
Nyctalus noctula	+	+	–	–	–
Otonycteris hemprichii	–	–	+	+	+
Plecotus macrobullaris	–	–	+	–	–
Miniopterus schreibersii	+	+	+	+	–
Tadarida teniotis	+	+	+	+	+

& Yom-Tov (1999), the southernmost records of *M. aurascens*, *P. pipistrellus* and *H. savii* come from the Golan Heights of Syria and Upper Galilee of Palestine, and these areas also host southernmost breeding sites of *N. noctula*. The southern margin of the Levantine distribution of *E. anatolicus* lies in the Mediterranean part of Syria (Fig. 93) and the southernmost known localities of occurrence of *P. macrobullaris* come from the Anti-Lebanon Mts of Syria (Fig. 151). The Syrian range of *M. myotis* represents the southeasternmost fringe of its whole distribution range. On the other hand, three eremial elements, *T. nudiventris*, *A. tridens* and *O. hemprichii* have a northern limit of their distribution ranges on the margins of semi-deserts in northern areas of Syria (Figs. 15, 50, and 145) (although the ranges of *T. nudiventris* and *O. hemprichii* slightly penetrate across the northern Syrian border).

A zoogeographical comparison of the Syrian bat fauna in a broader interregional context of faunas of the Middle East and the eastern Mediterranean will be a matter of a detailed analysis published elsewhere (Horáček & Benda, in prep.).

Taxonomy

The general zoogeographical framework of the Syrian bat fauna is reflected to a certain level also in the patterns of intraspecific and/or intrageneric variation within particular bat taxa. This holds true e.g. on the Syrian representatives of the genus *Eptesicus*: *E. serotinus shiraziensis* and *E.*

anatolicus, both in the sense of the above reviews (see pp. 146–155, 160–173), are endemics of the Mediterranean regions of the Near East stretching from southern Turkey to southern Iran, via the Levantine Mediterranean subregion (but in the case of *E. s. shiraziensis* rather hypothetically) while the remaining *Eptesicus* species, *E. bottae*, presents a separate Mesopotamian form, *E. b. hingstoni*. The same pattern has been found in another 'semi-desert' element in the Syrian fauna, the *Taphozous nudiventris* complex; Mesopotamia from Turkey to Iran is inhabited by its most distinct form, *T.* (*nudiventris*) *magnus*.

However, two other species of the latter faunal type, *Asellia tridens* and *Otonycteris hemprichii*, most probably show similarity to the populations of a broader area, of North Africa and the northern part of the Middle East. *A. tridens* is represented by only one morphotype in this wide region, co-identified with the subspecies *A. t. murraiana*. A similar intraspecific taxonomy is found also within *O. hemprichii*, its Syrian populations showing most affinity to North African and Arabian, i.e. nominotypical populations (although the exclusivity of its Mesopotamian populations might come also in question, eventually).

The species belonging to the Mediterranean elements in the fauna of Syria most often show their taxonomic affinity to the populations inhabiting the European and Maghrebian parts of the Mediterranean. Typically, it concerns *Rhinolophus hipposideros*, *R. blasii*, *Myotis nattereri*, *M. emarginatus*, and *Tadarida teniotis* and most probably also *Myotis myotis* and *Pipistrellus pipistrellus* (see the particular taxonomic chapters for discussion). According to traditional taxonomy, Syrian populations of all these species are classified under the taxa based on their European and in some cases also African populations. This group also includes the Mediterranean part of Syrian populations of *Rhinolophus ferrumequinum*, while its 'semi-desert' populations from the Euphrates Valley, traditionally considered to be a separate form, *R. f. irani*, apparently composes an independent group morphologically close to the *R. ferrumequinum* populations of Iraq, southern Iran, Pakistan and Afghanistan (see also DeBlase 1980).

A similar affinity to populations living in the Middle East, but in its Mediterranean parts, is apparent in another group of species; Syrian representatives of *Myotis blythii*, *Pipistrellus kuhlii*, *Plecotus macrobullaris*, and *Miniopterus schreibersii* (and possibly also of *Myotis capaccinii*) present taxa distributed solely or mainly in the Near East from the Levant to the north and east. Another type of endemism centred to the Levant is found in a group composed of *Rousettus aegyptiacus* and *Rhinolophus mehelyi*, and also in *R. euryale* and *Nyctalus noctula*. While the former two species have endemic populations in the Levant and northeastern Africa, the latter two species are represented with the forms restricted (most probably) solely in the Levant (*M. myotis* belongs also to the latter pair, according to the traditional view).

To conclude, we can – with a certain level of simplification – divide the Syrian bat fauna into six groups according to their taxonomic affinities:

(1) Mediterranean species with the (prevailing) affinity to the northwest: *R. f. ferrumequinum*, *R. hipposideros*, *R. blasii*, *M. myotis*, *M. nattereri*, *M. emarginatus*, *M. aurascens*, *H. savii*, *P. pipistrellus*, and *T. teniotis*;

(2) Mediterranean species with the affinity to the east: *M. blythii*, *E. serotinus*, *E. anatolicus*, *P. kuhlii*, *P. macrobullaris*, and *M. schreibersii* (possibly *M. capaccinii*);

(3) Mediterranean species with Levantine endemism: *R. aegyptiacus*, *R. euryale*, *R. mehelyi* and *N. noctula* (according to traditional view, also *M. myotis*);

(4) Semi-desert species with Mesopotamian endemism: *T. nudiventris* and *E. bottae* (possibly *O. hemprichii*);

(5) Semi-desert species with the affinity to eastern arid regions: *R. f. irani* [partim];

(6) Semi-desert species with the affinity to a broader part of the Saharo-Sindian region: *R. microphyllum*, *R. hardwickii*, *A. tridens* and most probably also *O. hemprichii*.

However, such classification has to be considered preliminary, as an accurate conclusion on the actual position of the Syrian population of the respective species within each specific taxonomy can be made only with a help of genetic comparison. Anyway, the apparent distinctions among at least a part of the analysed amount of species clearly suggest different types, ways and ages of colonisation history of the Syrian territory by members of its present bat fauna and indicate it to represent ‘crossroads of crossroads’ also in the aspect of chiropteran zoogeography.

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APPENDIX I

Gazetteer

The coordinates and altitudes were measured in the field by the GPS. The published data or those taken from a map are in brackets. The approximated sites from the maps by Mendelssohn & Yom-Tov (1999) are not included.

site	province	coordinates	altitude [m a. s. l.]
Abu Kamal, Wadi ar Ratgah	Deir ez Zur	34° 26’ N, 40° 55’ E	190
Afqa cave = Tadmor, Afqa cave			
Afqa spring = Tadmor, Afqa cave			
‘Ain Diwar, creek ca. 5 km to SW	Hassake	37° 14’ N, 42° 11’ E	430
Al Bas’ah, rocks	Deir ez Zur	[35° 40’ N, 39° 50’ E]	–
Al Lathiqiyeh	Al Lathiqiyeh	[35° 31’ N, 35° 48’ E]	–
Al Ghazli, wadi	Raqqa	36° 20’ N, 39° 05’ E	320
Al Manfa Cave, 3 km E of Hammam	Idlib	[35° 55’ N, 36° 23’ E]	–
Al Qaryatein	Homs	[34° 14’ N, 37° 46’ E]	–
Al Tawani, 5 km S Jaba Deen	Dimashq	33° 46’ N, 36° 30’ E	1190
Al Watta Cave near Baniyas	Quneitra	[33° 15’ N, 35° 19’ E]	–
Aleppo = Halab			
Aleppo Bazar = Halab			
Amwd, small cave	Al Lathiqiyeh	[35° 36’ N, 36° 03’ E]	–
Apamea (Kalaa El-Moudik) = Qala’at al Mudiq, Apamea ruins			
Ar Rawda near Rabi’ah	Al Lathiqiyeh	35° 49’ N, 36° 02’ E	600
As Sabkhah = As’sabkha			
As Salihiyyah, ruins of Dura Europos	Deir ez Zur	34° 45’ N, 40° 44’ E	230
As Salihiyyah, valley NW of Dura Europos	Deir ez Zur	34° 44’ N, 40° 45’ E	220
As’sabkha	Raqqa	[35° 49’ N, 39° 16’ E]	–
As’sahl	Dimashq	[34° 02’ N, 36° 40’ E]	–
Ayyash, dry wadi	Deir ez Zur	35° 26’ N, 40° 02’ E	220
Babl’hawa, border crossing point	Idlib	36° 14’ N, 36° 40’ E	–
Balis, necropolis	Halab	35° 59’ N, 38° 06’ E	320
Banias near Mt Hermon = Baniyas [Quneitra]			
Baniyas	Quneitra	[33° 15’ N, 35° 19’ E]	–
Baniyas, above a creek	Tartus	35° 11’ N, 35° 57’ E	10
Barqash, cave in a valley	Dimashq	33° 29’ N, 36° 00’ E	1370
Barqash, ruins of Byzantine church	Dimashq	33° 28’ N, 35° 59’ E	1440
Bloudan	Dimashq	33° 44’ N, 36° 08’ E	1570
Bosra, citadel ruins	Der’a	32° 32’ N, 36° 29’ E	850
Camp Faouar, Golan Heights	Quneitra	[33° 10’ N, 35° 52’ E]	–
Casret-Mohamed-Ali = Kisret Mhamadali			
Cater Magara = Qatr Magara			
Dimashq	Dimashq	[33° 32’ N, 36° 15’ E]	–
Djéroud = Jeiroud			
Dura Europos = As Salihiyyah			
Eulenschacht cave = Raqqa, ‘Eulenschacht’ cave			
Gamla, excavations	Quneitra	32° 54’ N, 35° 44’ E	500
Halab	Halab	[36° 12’ N, 37° 10’ E]	–
Halabiye = Halabiyyeh			
Halabiyyeh, ancient fortress city ruins	Deir ez Zur	35° 41’ N, 39° 50’ E	230
Hama, municipal museum building	Hama	35° 08’ N, 36° 45’ E	–
Hammam, Afqa spring = Tadmor, Afqa cave			
Harasta	Dimashq	[33° 33’ N, 36° 23’ E]	–
Hassake, city park	Hassake	36° 30’ N, 39° 45’ E	–
Hayalien, water pit	Al Lathiqiyeh	35° 06’ N, 36° 16’ E	980
Ikersheh	Raqqa	[35° 51’ N, 39° 08’ E]	–
Jabla	Al Lathiqiyeh	[35° 21’ N, 35° 56’ E]	–
Jabla, forest ca. 10 km to N	Al Lathiqiyeh	35° 28’ N, 35° 54’ E	5

site	province	coordinates	altitude [m a. s. l.]
Jeiroud	Dimashq	[33° 48’ N, 36° 44’ E]	–
Karyatein = Al Qaryatein			
Kassab, border crossing-point	Al Lathiqiyeh	[35° 55’ N, 36° 59’ E]	–
Khad Nes, Jordan river	Quneitra	32° 56’ N, 35° 38’ E	–190
Khazneh, Jebel ‘Abd al ‘Aziz, cave	Hassake	36° 27’ N, 40° 20’ E	520
Kisret Mhamadali	Raqqa	35° 53’ N, 39° 02’ E	270
Krak des Chevaliers = Qala’at al Hosn, Krak des Chevaliers			
Kursi, Lake Tiberias shore	Quneitra	32° 49’ N, 35° 39’ E	–205
Maalula	Dimashq	[33° 51’ N, 36° 32’ E]	–
Madan, ‘Staubleichenhöhle’ cave	Deir ez Zur	[35° 45’ N, 39° 40’ E]	–
Mari, excavation area	Deir ez Zur	34° 33’ N, 40° 54’ E	–
Marshadeh, rocks	Deir ez Zur	[34° 30’ N, 40° 57’ E]	–
Mashta Deir Mama, rocks	Al Lathiqiyeh	35° 08’ N, 36° 20’ E	450
Mayadin	Deir ez Zur	[35° 01’ N, 40° 27’ E]	–
Mejadin = Mayadin			
Mishirfeh, SE bank of the Lake Assad	Raqqa	35° 49’ N, 38° 28’ E	300
Mount Hermon	Quneitra	[33° 20’ N, 35° 47’ E]	–
Nahal Gilbon	Quneitra	[33° 03’ N, 35° 40’ E]	–
Najmouk, field 2 km to SW	Hassake	37° 02’ N, 41° 05’ E	420
Okersheih = Ikersheh			
Palmyra = Tadmor			
Palmyra, ‘Sole-Stollen’ = Tadmor, Afqa cave			
Qal’a ar Rahba = Qala’at ar Rahba			
Qala’at al Hosn, Krak des Chevaliers	Homs	34° 45’ N, 36° 18’ E	640
Qala’at al Hosn, garden 5 km to W	Tartus	[34° 46’ N, 36° 12’ E]	–
Qala’at al Marqab, castle ruins	Tartus	35° 09’ N, 35° 57’ E	360
Qala’at al Mudiq, Apamea ruins	Hama	[35° 25’ N, 36° 25’ E]	–
Qala’at ar Rahba, castle ruins	Deir ez Zur	35° 00’ N, 40° 25’ E	220
Qala’at Ja’Abar, castle ruins	Raqqa	35° 55’ N, 38° 29’ E	320
Qala’at Ja’Abar, camp ca. 1 km NW	Raqqa	[35° 38’ N, 38° 12’ E]	–
Qala’at Najm, castle ruins	Halab	36° 33’ N, 38° 16’ E	360
Qala’at Nimrud [= Subeiba], castle	Quneitra	33° 15’ N, 35° 43’ E	–
Qala’at Salah ad Din, castle ruins	Al Lathiqiyeh	35° 36’ N, 36° 03’ E	370
Qala’at Samaan, Byzantine ruins	Halab	36° 20’ N, 36° 51’ E	550
Qala’at Sheisar, castle ruins	Hama	35° 17’ N, 36° 34’ E	250
Qala’at Sukkara, Jebel ‘Abd al ‘Aziz	Hassake	[36° 24’ N, 40° 23’ E]	–
Qanawat, garden house	Suweida	[32° 46’ N, 36° 37’ E]	–
Qantara, Orontes River 2 km to S	Hama	35° 00’ N, 36° 53’ E	310
Qaryateine = Al Qaryatein			
Qariateine = Al Qaryatein			
Qasr Ibn Wardan, Byzantine church	Hama	35° 22’ N, 37° 15’ E	410
Qater Maghara, SE of Ratla = Qatr Magara			
Qatr Magara	Raqqa	[35° 52’ N, 39° 01’ E]	–
Qattinah, under dam	Homs	34° 40’ N, 36° 37’ E	550
Qatura, necropolis	Halab	36° 19’ N, 36° 50’ E	470
Rakka = Raqqa			
Raqqa	Raqqa	[35° 57’ N, 39° 02’ E]	–
Raqqa, excavations	Raqqa	[35° 56’ N, 39° 05’ E]	–
Raqqa, ‘Eulenschacht’ cave	Raqqa	[35° 52’ N, 38° 58’ E]	–
Raqqa, ‘Taubenbrunnen’ cave	Raqqa	[35° 55’ N, 39° 00’ E]	–
Rasafah, ancient ruins	Raqqa	35° 38’ N, 38° 46’ E	310
Ras al Ain, cave	Dimashq	33° 54’ N, 36° 36’ E	1600
Ras al Bassit, northern bridge	Al Lathiqiyeh	35° 52’ N, 35° 53’ E	5
Ras al Bassit, southern bridge	Al Lathiquieh	35° 51’ N, 35° 51’ E	5
Safita, fortress church	Tartus	34° 49’ N, 36° 07’ E	350
Safita, river ca. 5 km to SE	Tartus	34° 50’ N, 36° 10’ E	210

site	province	coordinates	altitude [m a. s. l.]
Sarghaya, gardens	Dimashq	33° 50’ N, 36° 11’ E	1330
Sbeikhan, caves	Deir ez Zur	34° 50’ N, 40° 34’ E	200
Sia, ‘Suweida Dam’	Suweida	32° 43’ N, 36° 39’ E	1470
Slinfeh, water pit	Al Lathiqiyeh	35° 36’ N, 36° 13’ E	1350
Staubleichenhöhle cave = Madan, ‘Staubleichenhöhle’ cave			
Tadmor, Afqa cave	Homs	34° 33’ N, 38° 17’ E	250
Tadmor, ancient ruins	Homs	34° 33’ N, 38° 17’ E	250
Tadmor, city & palmeria	Homs	34° 33’ N, 38° 17’ E	250
Tadmor, rocks 5 km W of ruins	Homs	[34° 34’ N, 38° 13’ E]	–
Tadmor, ‘Palmyra Dam’	Homs	34° 33’ N, 38° 17’ E	250
Tadmur, Hammam (Afqa spring) = Tadmor, Afqa cave			
Talkalakh	Homs	[34° 40’ N, 36° 17’ E]	–
Talsh’hab, waterfall	Der’a	32° 42’ N, 35° 58’ E	430
Taubenbrunnen cave = Raqqa, ‘Taubenbrunnen’ cave			
Tell Kalakh = Talkalakh			
Tell Kalakh, Krak des Chevaliers = Qala’at al Hosn, Krak des Chevaliers			
Tell Sheikh Hamad, Al Khabour river	Deir ez Zur	35° 39’ N, 40° 44’ E	250
Ya’ar Oden forest	Quneitra	33° 12’ N, 35° 46’ E	1100
Yabroud, cave	Dimashq	33° 59’ N, 36° 38’ E	1370
Zalabiyyeh, rocks under ancient ruins	Deir ez Zur	[35° 43’ N, 39° 46’ E]	–

APPENDIX II
List of comparative material

Rousettus aegyptiacus (Geoffroy, 1810)

Cyprus: 1 m (NMP 90435 [S+A]), 2 km SW Prodromi, Androlikou Gorge, 20 April 2005, leg. P. Benda & V. Hanák; – 1 ind. (NMP 90399 [S]), Akamas Pen., Baths of Aphrodite, 10 April 2005, leg. P. Benda & V. Hanák; – 1 m (NMP 91274 [S+A]), Akamas Pen., Smigies Trail, Magnesia Mine, 27 March 2005, leg. I. Horáček, P. Hulva & R. Lučan. – **Egypt**: 8 m, 6 f, 1 ind. (IVB 1–3, 5–10, 13–16, 18 [S+B], MUB 1.1.106 [S]), Cairo, Sultan Hamid Mosque, 23 April 1969, June 1971, leg. J. Gaisler & J. Groschaft; – 3 m, 7 f (ZFMK 63.267–63.272, 63.274 [S+B], 63.275–63.277 [S]), Cairo, Sultan Hassan Mosque, 11 May 1951, leg. H. Hoogstraal; – 4 inds. (NMP 91817–91820 [S]), Dakhla Oasis, 17 April 2002, leg. P. Muclinger & P. Nová; – 2 m, 1 f (ZFMK 94.499, 94.501 [S+B], 94.502 [S+Sk]), Egypt (undef.), 17 August 1994, coll. Airport Düsseldorf; – 2 inds. (ZFMK 62.199, 62.200 [S]), Egypt (undef.), coll. Möhres. – **Iran**: 5 m, 5 f (NMP 48377–48386 [S+A]), Espakeh (Baluchestan), 10 April 2000, leg. P. Benda & A. Reiter; – 3 m, 6 f (NMP 40467/1, 40467/3–10 [S+B]), Isin (Hormozgan), 29 April and 2 May 1977, leg. B. Pražan. – **Lebanon**: 1 m (AUB M021 [S+B]), Antelias, 19 March 1960, leg. J. E. Stencel; – 1 f (AUB M006 [S+B]), cave 4 km SE of Beit Meri, 4 October 1959, leg. R. E. Lewis. – **Turkey**: 1 m (ZFMK 65.205 [S+B]), Dermustlu Köy, Höhle bei Antakya, 2 January 1952, leg. H. Kumerloeve. – **Yemen**: 3 m, 2 f (NMP pb3112–pb3116 [S+A]), 5 km W of Hammam Ali, 27 October 2005, leg. P. Benda; – 2 f (NMP pb3056, pb3057 [S+A]), Al Khuraybah, Wadi Daw'an, 19 October 2005, leg. P. Benda; – 2 m, 1 f (NMP pb2959–pb2961 [S+B]), Hawf, 12 October 2005, leg. P. Benda; – 2 f (NMP pb3118, pb3119 [S+B]), Jebel Bura, W of Riqab, 30 October 2005, leg. P. Benda; – 2 m (NMP pb2943, pb2944 [S+A]), Ma'arib, 9 October 2005, leg. P. Benda; – 1 m (NMP pb2956 [S+A]), Sah, Wadi Haramawt, 11 October 2005, leg. P. Benda; – 1 f (NMP pb3159 [S+A]), Wadi Al Lahm, W of Al Mahwit, 1 October 2005, leg. P. Benda; – 1 m (NMP pb2917 [S+A]), Wadi Dhahr, 15 km N of Sana'a, 6 October 2005, leg. P. Benda; – 2 f (NMP pb3089, pb3090 [S+A]), Wadi Maytam, 12 km SE Ibb, 26 October 2005, leg. P. Benda.

Rhinopoma microphyllum (Brünnich, 1782)

Afghanistan: 1 m (ZFMK 96.448 [S+B]), 8 km N of Jalalabad, 34° 26' N, 70° 25' E, 23 March 1972, leg. J. Niethammer; – 1 m (MHNG 952.82 [S+A]), Farah, Grande Grotte Moumlai, 26 April 1958, leg. K. Lindberg; – 1 ind. (ZFMK 96.454 [S+B]), Kandahar, 31° 36' N, 65° 47' E, 6 August 1966, leg. J. Niethammer; – 1 m (MHNG 952.77 [S+A]), Kandahar, Grotte Chamchir, 4 December 1957, leg. K. Lindberg; – 6 m, 4 f (IVB AF582, AF606, AF633, AF634, AF638–AF641, AF643, AF645 [S+B]), Chak-Naur, cave, 7 April 1967, leg. J. Gaisler. – **Egypt**: 4 inds. (SMF 11946–11949 [S]), Ägypten, before 1822, leg. E. Rüppell; – 2 ind. (SMF 1316, 1325 [S+Sk]), Ägypten, before 1831, leg. E. Rüppell; – 1 ind. (SMF 25800 [S]), südlich Cairo, 1955, leg. E. Kulzer; – 1 ind. (MHNG 683.31 [S+B]), Theben, 1905. – **India**: 1 m (BMNH 11.12.11.1 [S+B]), Bhuj, Cutch, 28 August 1911 (holotype of *Rhinopoma kinneari* Wroughton, 1912); – 3 f (MNHN 1985-1390, 1392, 1393 [S], Fathepur Sikri (Aqra), March 1961, leg. A. Brosset; – 3 ind. (MNHN 1985-1963–1965 [S]), Orcha, May 1961, leg. A. Brosset; – 1 f (MNHN 1985-1391 [S]), Saneni, March 1961, leg. A. Brosset; – 1 ind. (MHNG 913.8 [S]), Ssanchi, Bhopal, October 1955, leg. Pittet. – **Jordan**: 1 f (NMP 47965 [S+A]), Tabaqat Fal, 4 July 1997, leg. P. Benda. – **Lebanon**: 1 ind. (MNHN 1983-1632 [S]), Grotte de Litani, 30 July 1962, leg. A. Khaikallah. – **Pakistan**: 4 f (MNHN 1983-1630, 1631, 1997, 1999 [S]), Karachi, 21 June 1965, leg. M. A. El Hussein. – **Sudan**: 1 f (ZFMK 96.457 [S+Sk+B]), Djebel, ca. 30 km NW of Khartoum, 15° 33' N, 32° 32' E, 18 March 1986, leg. J. Niethammer; – 1 m (ZMB 2578 [S+A]), Weisser Nil, leg. Lepsius (lectotype of *Rhinopoma lepsianum* Peters, 1859).

Rhinopoma hardwickii Gray, 1831

Afghanistan: 3 m, 2 f (IVB AF1009–AF1013 [S+B]), Darunta, cave, 2 May 1967, leg. J. Gaisler; – 2 f, 2 inds. (ZFMK 96.452, 96.453 [S+B], 96.466, 96.474 [S]), ca. 8 km N of Jalalabad, 34° 26' N, 70° 25' E, 1 July 1966, 23 March 1972, leg. J. Niethammer. – **Egypt**: 2 m, 7 f (IVB E23, E24, E26, E27, E34–36, E38 [S+B]), Cairo, Bar Kouky mosque, 21 April 1969, leg. J. Gaisler; – 2 m, 10 f (IVB E135–144, E146, E147 [S+B]), Dandara, Temple of Hathor, 27 April 1969, leg. J. Gaisler; – 1 m, 3 f (ZFMK unnumbered [S]), Dendera; – 1 m, 2 f (IVB E81, E82, E84 [S+B]), Karnak, Temple, 26 April 1969, leg. J. Gaisler; – 1 f (BMNH 2.1.17.2. [S+B]), Luxor, leg. N. C. Rotschild (holotype of *Rhinopoma cystops* Thomas, 1903); – 1 m (IVB E199 [S+B]), Luxor, Valley of Kings, tomb, 30 April 1969, leg. J. Gaisler; – 4 m, 4 f (IVB E40–42, E49, E050, E55–57 [S+B]), Sakkara, Prison of Joseph, 23 April 1969, leg. J. Gaisler. – **India**: 2 f (MNHN 1985-1386, 1387 [S]), Badami, November 1960, leg. A. Brosset; – 2 m, 1 f (ZFMK 96.449–96.451 [S+B]), Bhubaneswar, 20° 13' N, 85° 50' E, 23 January 1965, leg. J. Niethammer; – 1 m (MNHN 1902-502a [S]), Genji Coromandel, August–September 1901, leg. M. Maindron; – 1 f (MNHN 1985-1388 [S]), Hampi, November 1960, leg. A. Brosset; – 1 m (BMNH 1.e. [S]), India [Bengal], leg. Hardwicke (holotype of *Rhinopoma hardwickii* Gray, 1831); – 1 m (MNHN 1962-343b [S]), Vigayunagar, October 1960, leg. A. Brosset. – **Iran**: 2 f (NMP 48162, 48163 [S+A]), Izeh, 12 October 1998, leg. A. Reiter & M. Uhrin; – 1 m (NMP 48157 [S+A]), Jeiugir, 11 October 1998, leg. J. Obuch. – **Israel**: 1 f (SMF 19596 [S]), Galilee, ded. Z. Lev; – 1 m (SMF 18985 [S]), Israel (undef.), ded. Z. Lev. – **Jordan**: 9 m (NMP 47966–47974 [S+A]), Tabaqat Fal, 4 July 1997, leg. P. Benda. – **Saudi Arabia**: 4 m, 3 f (SMF 60891–60894, 60896–60898 [S]), bei Medina, 19 November 1971, leg. I. Nader; – 2 m, 2 f (BMNH 48.351–48.354. [S+B]), W Arabia, Al Bada, 300 mts, 28° 30' N, 35° 05' E, 25 March 1947, leg. G. Popov. – **Sudan**: 1 m (ZFMK 96.455 [S+B]), 6. Katarakt, ca. 100 km N Khartoum, 15° 33' N, 32° 32' E, 7 March 1986, leg. J. Niethammer; – 1 m (ZFMK 96.456 [S+Sk+B]), Djebel, ca. 30 km NW Khartoum, 15° 33' N, 32° 32' E, 18 March 1986, leg. J. Niethammer. – **Yemen**: 2 m, 6 f (NMP pb2947–pb2954 [S+A]), Al Azhlaniya, Wadi Haramawt, 10 October 2005, leg. P. Benda; – 2 m (SMF 91021, 91022 [S+B]), Al-Dimnah, Najd Khamran, Lahej Gov., 29 March 1999, leg. E. Sadik & I. Al-Qubati; – 4 m, 4 f (NMP pb2920–pb2927 [S+A]), Ma'arib, 8 October 2005, leg. P. Benda; – 1 m, 1 f (BMNH 99.11.6.29., 99.11.6.32. [S+B]), Myba, near Aden, leg. W. Dodson; – 5 m, 2 f (BMNH 13.6.19.1.–13.6.19.5., 13.6.19.7., 13.6.19.8. [S+B]), Wasil, 4000 ft., 6 March 1913, leg. G. W. Bury (including the holotype of *Rhinopoma cystops arabium* Thomas, 1913).

Taphozous nudiventris Cretzschmar, 1830

Aghanistan: 5 m, 16 f (IVB 2–20, NMP AF941, AF942 [S+B]), Chak-Naur, cave, 7 and 19 April 1967, leg. J. Gaisler; – 1 ind. (ZFMK 96.545 [S+Sk]), 5 km N Jalalabad, 34° 26' N, 70° 25' E, 28 November 1965, leg. J. Niethammer. – **Egypt**: 4 m, 3 f, 12 inds. (NMP E1–13, E15–18, E42, E47 [S+B]), Abu Rawash, 15 and 17 June, 10 July, 15 September, and 18 October 1971, leg. B. Ryšavý; – 3 m, 2 f (IVB 29–33 [S+B]), Cairo, Sultan Mahmud Mosque, 21 April 1969, leg. J. Gaisler; – 3 f (ZFMK 96.546–96.548 [S]), Gebel el Lahun, Fayum, Beni Suef, 29° 05' N, 31° 05' E, 8 August 1988, leg. J. Handwerk; – 1 m, 2 f, 2 inds. (IVB 28, MUB 1.1.108, 1.1.109 [S+B], NMP E20, E21 [S]), Gizeh, pyramids, 20 April 1969, 22 May and 15 September 1971, leg. J. Gaisler & J. Groschaft; – 1 ind. (SMF 4310 [S]), Gizeh, before 1824, leg. E. Rüppell (lectotype of *Taphozous nudiventris* Cretschmar, 1830); – 4 m, 3 f (IVB 21–27 [S+B]), Karnak, Great Temple, 26 April and 1 May 1969, leg. J. Gaisler; – 1 ind. (ZFMK 97.260 [S]), Pyramiden von Maidum, 29° 23' N, 31° 10' E, 3 December 1986, leg. J. Handwerk; – 3 inds. (SMF 12080, 12082, 12083 [S]), Ägypten, before 1824, before 1831, leg. E. Rüppell. – **India**: 3 f (ZFMK 96.542–96.544 [S]), Fatehpur Sikri, 27° 06' N, 77° 39' E, 12 January 1965, leg. J. Niethammer; – 1 f (SMF 19855 [S]), Jodhpur, 12 November 1961; – 1 m (SMF 86456 [S]), Umgebung Madurai-Kamaraj, Tamil Nadu, ca. 1985, leg. J. Habersetzer. – **Iran**: 3 m (NMP 48188, 48189 [S+A], JOC unnumbered [S+Sk]), Choqa Zanbil, 15 October 1998, leg. P. Benda & J. Obuch. – **Iraq**: 3 f, 1 ind. (SMF 34203–34205, 34440 [S]), Amara, 25 October 1961, leg. K. Al-Robbae; – 1 m (NMW 8377 [S+A]), Basra, September 1910, leg. V. Pietschmann (holotype of *Taphozous magnus* von Wettstein, 1913); – 1 ind. (ISEA 5101 [S]), Hatra I., 29 May 1905; – 1 ind. (SMF 34441 [S]), Khan al Nuss, 20 April 1962, leg. K. Al-Robbae; – 1 ind. (SMF 34207 [S]), Iraq (undef.), 1961–1962, leg. K. Al-Robbae. – **Sudan**: 1 f (IVB 1 [S+B]), Khartum, 2 October 1970.

Rhinolophus ferrumequinum (Schreber, 1774)

Algeria: 9 m, 4 f (MUB A13, A40, A328, A329, A355, A356, A372, A402, A415, A426, A439, A455, A456 [S+B]), Bejaïa, Aokas, mine, 7 April and 7 May 1981, 7 and 28 October, 26 November 1982, 25 February, 24 March, 15 April, 16 May, and 10 June 1983, leg. J. Gaisler; – 2 m (MUB A389, A390 [S+B]), Bordj-Mira, mine, 14 January 1983, leg. J. Gaisler; – 1 m (MUB A511 [S+B]), Brezina, 23 July 1983, leg. J. Gaisler; – 1 m (MUB A205 [S+B]), Gages de Kherrata, tunnel, 15 January 1982, leg. J. Gaisler; – 1 f (MUB A091 [S+B]), Grotte Aftis, 17 September 1981, leg. J. Gaisler; – 1 m (MUB A219 [S+B]), Grotte Les Falaises, 23 April 1982, leg. J. Gaisler; – 1 ind. (MUB A406 [S+B]), Souk-el-Tenine, Grotte, 25 February 1983, leg. J. Gaisler. – **Azerbaijan**: 2 m (NMP 91275 [S+A], 91441 [S+B]), Gobustan, rocky town, 20 June 1979, 22 June 1987, leg. I. Rehák & M. Švátora; – 1 m, 1 f, 7 inds. (NMP 91453, 91454 [S+B], 91406–91409, 91411, 91412 [S+A], 91410 [S+B]), Mingeçevir, cave, 25 June 1984, 27 June 1986, leg. D. Frynta, J. Moravec & I. Rehák; – 2 m, 1 f (NMP 91299, 91300, 91305 [S+A]), Şemaxa, 26 June 1979, leg. I. Rehák. – **Bulgaria**: 1 m (NMP 49808 [S+A]), Dabromir, 30 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 4 m, 2 f (NMP 38549, 38550, 38552, 38558, 47/72/C30, 47/72/C36 [S+B]), Jagodina, 2 and 3 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 5 m, 9 f (IVB 1095, 1096, 1098, NMP 49360, 49363, 50206, 50208, 50209, 50211, 50213, 50216, 50217, 50289, 50424 [S+B]), Karlukovo, 7 February 1965, 3, 5 and 6 July 1976, 6 and 8 August 1978, leg. M. Braniš, P. Donát, J. Figala, J. Flegr, J. Gaisler, V. Hanák, I. Horáček, K. Hůrka, J. Janda, J. Jirouš, V. Švihla & V. Vohralík; – 2 m, 1 f (IVB 8–10 [S+B]), Karlukovo, Tamnata dupka Cave, 3 October 1962, leg. J. Gaisler; – 3 m (NMP 49750, 50293, 50294 [S+A]), Karlukovo, Temnata dupka Cave, 7 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 1 f (NMP 50225 [S+A]), Karlukovo, touristic hut, 12 June 1977, leg. V. Bejček, J. Škopek, P. Vašák & V. Vohralík; – 3 f (NMP 50321–50323 [S+A]), Komunari, 12 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 1 m (NMP 40923 [S+B]), Kotel, 20 June 1982, leg. D. Frynta, D. Holečková, I. Horáček, H. Prágerová & V. Vohralík; – 1 f (IVB 28 [S+B]), Lakatnik, 10 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 2 m, 1 f (IVB 4–7 [S+B]), Lakatnik, Ražiška dupka Cave, 30 September 1962, leg. J. Gaisler; – 1 m, 3 f (NMP 49144, 49145, 49812 [S+B], 50423 [B]), Lakatnik, Suhata peštera Cave, 18 March 1956, 19 May 1957, 3 January 1962, leg. V. Hanák & J. Sklenář; – 1 ind. (NMP 49811 [S+B]), Lakatnik, Temnata dupka Cave, 3 January 1962, leg. J. Sklenář; – 2 m, 1 f (NMP 50138–50140 [S+B]), Lakatnik, Vraži dupka Cave, 19 March 1956; – 4 m, 2 f (IVB 21–26 [S+B]), Malka Brestnica, 8 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 3 m (NMP 50334, 50369, 50370 [S+A]), Orehovo, 25 August 1980, 28 June 1984, leg. D. Holečková, J. Jirouš, D. Král, H. Prágerová, T. Scholz & V. Vohralík; – 2 f (IVB 3, 17 [S+B]), Peštera, Nova peštera Cave, 18 September 1962, 4 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 4 m, 17 f (NMP 49841, 49842, 50331–50333, 50358, 50374–50377, 50345–50352, 50354, 50356, 50357 [S+A]), Ploski, cave, 8 July 1980, 19 July 1981, 17 July 1982, 14 August 1987, J. Flousek, D. Frynta, R. Fuchs, D. Holečková, I. Horáček, J. Jirouš, P. Musil, H. Prágerová & V. Vohralík; – 2 m, 9 f (NMP 38551, 38553, 38554, 38557, 47/72/C53, 47/72/C67, 47/72/C75, 47/72/C87, 47/72/C88, 47/72/C95, 47/72/C107 [S+B]), Primorsko, 17 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 1 f (NMP 49346 [S+B]), Ropotamo, 6 June 1957, leg. V. Hanák; – 1 f (IVB 27 [S+B]), Zlatna Panega, Panežka izvira Cave, 8 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 4 inds. (NMP 47/72/A–E [S+B]), Bulgaria (undef.), August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek. – **Cyprus**: 1 m (NMP 91235 [S+A]), Afendrika, 17 October 2005, leg. I. Horáček, P. Hulva & R. Lučan; – 1 m, 5 f (NMP 91248, 91204 [A], 91249, 91250, 91205, 91206 [S+A]), Akamas Pen., Smigies Trail, mines, 27 March and 12 October 2005, leg. I. Horáček, P. Hulva & R. Lučan; – 2 m (NMP 90425, 91234 [S+A]), 4 km SE of Cinarli, Inçirli Cave, 17 April and 15 October 2005, leg. P. Benda, V. Hanák, I. Horáček, P. Hulva & R. Lučan; – 1 f (NMP 90432 [S+A]), 3 km NW of Kalavasos, mine, 19 April 2005, leg. P. Benda & I. Horáček; – 1 m (NMP 91225 [S+A]), Troodos Forest, 4.5 km SW of Kakopetria, mine, 14 October 2005, I. Horáček, P. Hulva & R. Lučan. – **Georgia**: 1 m, 11 f (NMP 91519–91521, 91527, 91537, 91542, 91546, 91548, 91549, 91553–91555 [S+B]), Džali near Suhumi, tunnel, 14 July 1964, leg. V. Hanák; – 4 f (NMP 91485–91488 [S+B]), Staraja Macesta nr. Soči, 24 June 1960, leg. V. Hanák. – **Greece**: 1 m (NMP 48568 [S+B]), Delphi, 23 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 f (NMP 48709 [S+B]), Despotiko Cave, 3 July 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 m (NMP 48729 [S+A]), Kombotades, bunker, 11 September 1996, leg. M. Andreas, P. Benda & M. Uhrin; – 2 f (NMP 48644, 48645 [S+B]), 2 km S of Maronia, above creek, 19 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 3 m, 1 f (NMP 48638, 48640, 48641 [S+B], 48639 [S]), 3 km SW of Maronia, Cave of the Cyclops Polyphemos, 19 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (NMP 48608 [S]), Petralona, cave, 28 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m (NMP 48688 [S+B]), Thassos, Panagia, Drakotrypa Cave, 24 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 m (NMP 49049 [S+A]), Prespa, Zachariani Cave, 3 September 2001, leg. P. Benda; – 3 f (NMP 48697–48699 [S+B]), Thassos, 1 km W of Arhangelou Monastery, 26 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík. – **Iran**: 1 f (NMP 48148 [S+A]), Bisotun, 8 October 1998, leg. M. Andreas & A. Reiter; – 1 m (NMP 48352 [S+A]), Deh Bakri, 7 April 2000, leg. A. Reiter & J. Obuch; – 1 m (NMP 48122 [S+A]), 10 km SE of Choplu, 3 October 1998, leg. A. Reiter. – **Morocco**: 1 f (NMP 90035 [S+A]), Talkout, Oued Tessaouart, 30 August 2003, leg. P. Benda. – **Slovakia**: 1 m (NMP 129/58 [S+B]), Ardovo, Ardovská Cave, 5 February 1958, leg. V. Hanák; – 1 f (VSMK Z9682 [S]), Bôrka, 12 March 1978, ded. A. Mošanský; – 4 m, 4 f (NMP 163/58, 214/61, 218/61, 222/61, 226/61, 111/63, 113/63, 114/63 [S+B]), Drienovec, Drienovecká Cave, 6 February 1958, 18 February 1961, 4 and 6 March 1963, leg. V. Hanák; – 1 f (VSMK Z2628 [S]), Dubník, Libanka mine, 30 September 1963, leg. Tóth; – 1 f, 1 ind. (NMP J193, J194 [S+B]), Gombasek, Ludmila Cave, 11 December 1956, leg. V. Hanák; – 1 m, 1 f, 1 ind. (VSMK Z122, Z2621 [S+B], Z9512 [S]), Jasov, Jasovská Cave, 17 May 1952, 19 December 1958, leg. Kocourek & A. Mošanský; – 1 m (NMP Slo60 [S+B]), Muráň, 12 June 1975; – 1 ind. (VSMK Z8241 [S+B]), Ružín, 16 May 1975, leg. A. Mošanský; – 4 inds. (VSMK Z9600–9602, Z9365 [S+B]), Slovak Karst Mts (undef.), 5 and 14 December 1956, 1957, leg. J. Mituch; – 1 m (NMP 171/61 [S+B]), Tisovec, Kostolík Cave, 15 February 1961, leg. V. Hanák; – 1 m (VSMK Z9513 [S]), Veľká Lodina, 6 December 1958, leg. A. Mošanský; – 6 inds. (MUB 1.1.52, 1.1.92, 1.3.19, 1.3.30, 1.5.44, VSMK 74.204 [S+B]), Slovakia (undef.). – **Turkey**: 1 m, 9 f (NMP 47928–47933, 48089–48093 [S+A]), Çevlik, 20 May 1995, leg. P. Benda, J. Flegr & J. Sádlová; – 1 m (CUP T93/61 [S+A]), Derebük (Tunceli), 27 October 1993, leg. P. Benda & I. Horáček; – 1 m (NMP 90490 [S+A]), Muradiye, 23 June 2003, leg. J. Hájek & J. Hotový; – 1 f (CUP T93/60 [S+A]), Kürtler, 23 October 1993, leg. P. Benda & I. Horáček; – 1 f (CUP T93/39 [S+A]), Sarpdere, Dupnica Mağara Cave, 16 October 1993, leg. P. Benda & I. Horáček; – 4 m (CUP T93/69–72 [S+A]), Yalan Dünya Mağara Cave, 30 October 1993, leg. P. Benda & I. Horáček. – **Turkmenistan**: 1 f (NMP 91606 [S+B]), Bahardenskaja Cave, 29 July 1964, leg. V. Hanák. – **Uzbekistan**: 3 m, 1 f (MUB 1.4.33–1.4.36 [S+B]), Kadamžaj, cave, 22 May 1980, leg. J. Gaisler & V. Hanák; – 1 m, 1 f (NMP 91467, 91468 [S+B]), Tashkent, cave, 30 September 1963, leg. V. Hanák.

Rhinolophus hipposideros (Bechstein, 1800)

Algeria: 1 m (ISEA 9586 [S+B]), 20 km NW of Sebdou, 6 November 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 2 m (ISEA 9584, 9585 [S+B]), Brezina, cave, 31 October 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (MUB A204 [S+B]), Gorges de Kherrata, tunnel, 15 January 1982, leg. J. Gaisler; – 1 m (ISEA 9587 [S+B]), Misserghin, 14 December 1982, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m, 1 f (ISEA 9588, 9664 [S+B]), Sig, 4 and 25 January 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (MUB A237 [S+B]), Sebdou, 1 May 1982, leg. J. Gaisler. – **Bulgaria**: 1 f (NMP 49807 [S+A]), Bačkovo, cave, 30 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 2 m (NMP 49434, 49435 [S+A]), Bačkovo, Bačkovski Monastery, 14 July 1976, leg. M. Braniš, V. Hanák, I. Horáček, K. Hůrka, J. Jirouš, V. Švihla & V. Vohralík; – 1 f (NMNHS unnumbered [S]), Borovo, 19 March 1968, leg. P. Beron; – 2 m, 3 f (NMP 50091–50095 [S+B]), Brestnica, Saeva dupka Cave, 8 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 m (NMP 49433 [S+A]), Čepelare, 13 July 1976, leg. M. Braniš, V. Hanák, I. Horáček, K. Hůrka, J. Jirouš, V. Švihla & V. Vohralík; – 1 m (NMNHS unnumbered [S]), Filipovci, 27 February 1967, leg. P. Beron; – 1 ind. (NMNHS unnumbered [S]), Ginci, Tošova dupka Cave, 17 February 1968, leg. P. Beron; – 5 f (NMP 50027–50031 [S+A]), Gorna Breznica, 24 July 1981, leg. J. Flousek, R. Fuchs & V. Vohralík; – 2 m (NMP 49788, 49789 [S+A]), Jagodina, Gorna Karanska dupka Cave, 16 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 5 m, 1 f (NMP 49780–49786 [S+A]), Jagodina, Imamova dupka Cave, 15 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 2 m, 1 f (NMP 49354, 49758, 49777 [S+A]), Karlukovo, 5 July 1976, 8 and 9 August 1978, leg. M. Braniš, P. Donát, J. Flegr, V. Hanák, I. Horáček, K. Hůrka, J. Janda, J. Jirouš, V. Švihla & V. Vohralík; – 1 m (NMP 50080 [S+B]), Karlukovo, Bankova peštera Cave, 7 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 m (NMP 49753 [S+A]), Karlukovo, Temnata dupka Cave, 7 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 5 m (NMP 49793–49797 [S+A]), Kotel, 15 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 1 ind. (NMNHS N12 [S]), Kričim, leg. I. Bureš; – 2 m (NMP 50136, 50137 [S+B]), Lakatnik, Svinskata peštera Cave, 19 March 1956; – 1 ind. (NMP 49813 [S+B]), Lakatnik, Temnata dupka Cave, 3 January 1962, leg. J. Sklenář; – 1 m, 4 f (NMP 49368–49372 [S+A], Liljanovo, 9 July 1976, leg. M. Braniš, V. Hanák, I. Horáček, K. Hůrka, J. Jirouš, V. Švihla & V. Vohralík; – 5 m, 2 f (NMP 49997–50003 [S+A]), Orehovo, 30 August 1980, leg. D. Holečková, J. Jirouš, H. Prágerová & V. Vohralík; – 1 f (RMHR 739 [S]), Pepelina, Orlova čuka Cave, February 1961, leg. I. Ivanov; – 1 f (IVB 398 [S+B]), Peštera, Lilova skala Cave, 3 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 m (NMP 50072 [S+B]), Peštera, Nova peštera Cave, 4 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 m (NMP 50076 [S+B]), Peštera, Snežjanka Cave, 5 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 f (NMP 49347 [S+B]), Ropotamo, 6 June 1957, leg. V. Hanák; – 2 m (NMNHS N63, unnumbered [S]), Studen Kladenec, mine, 3 May 1996, leg. T. Ivanova; – 1 m (NMNHS unnumbered [S]), Trekljano; – 3 m, 1 f (NMNHS unnumbered [S]), Urvič, 8 April 1971, leg. V. Beškov. – **Cyprus**: 2 m (NMP 90424, 91269 [S+A]), 4 km SE Cinarli, Inçirli Cave, 6 and 17 April 2005, leg. P. Benda, V. Hanák, I. Horáček, P. Hulva & R. Lučan; – 3 m, 2 f (NMP 90924–90928 [S+A]), Troodos Forest, valley N of Kakopetria, mine, 27 July 2006, leg. P. Benda. – **Czech Republic**: 1 f (NMP 343/64 [S]), Jílové u Prahy, 30 October 1964, leg. V. Hanák; – 1 m (NMP E7 [S]), Karlštejn, mine, 15 February 1957, leg. V. Hanák; – 2 m, 1 f (NMP 341/58, 347/58, 348/58 [S]), Mníšek pod Brdy, 8 March 1958, leg. J. Sklenář; – 1 m (NMP ZN17 [S]), Vranov nad Dyjí, castle attic, 31 July 1957, leg. V. Hanák; – 1 m, 1 ind. (NMP ZB11, ZB12 [S]), Zbraslav, 1 December 1956, leg. V. Hanák; – 2 f (NMP ZN26, ZN27 [S]), Znojmo, castle attic, 3 August 1957, leg. V. Hanák. – **Greece**: 1 m, 6 f (NMP 48710–48715, 49028 [S+A]), Kombotades, bunker, 9 and 10 September 1996, 31 August 2001, leg. M. Andreas, P. Benda & M. Uhrin; – 1 f (NMP 48643 [S+B]), 3 km SW of Maronia, Cave of the Cyclops Polyphemos, 19 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík. – **Slovakia**: 5 m (NMP 118/58, 122/58, 123/58, 125/58, 130/58 [S]), Ardovo, Ardovská Cave, 5 February 1958, leg. V. Hanák; – 1 m, 1 f (NMP 101/58, 102/58 [S]), Domica, Čertova diera Cave, 5 February 1958, leg. V. Hanák; – 1 m, 2 f (NMP J185–J187 [S]), Kečovo, mine, 10 December 1956, leg. V. Hanák; – 5 m, 1 f (NMP 109/58–114/58 [S]), Domica, Liščia diera Cave, 5 February 1958, leg. V. Hanák; – 5 m, 1 f (NMP J209–J213, J215 [S]), Gombasek, Ludmila Cave, 11 December 1956, leg. V. Hanák. – **Turkey**: 1 f (CUP T93/63 [S+A]), Narlikuyu, 29 October 1993, leg. P. Benda & I. Horáček; – 1 m, 2 f (CUP T93/65, T93/67, T93/68 [S+A]), Yalan Dünya Mağara Cave, 30 October 1993, leg. P. Benda & I. Horáček; – 2 f (NMP 90488, 90489 [S+A]), Posyagbasan nr. Adana, 15 June 2003, leg. J. Hájek & J. Hotový.

Rhinolophus euryale Blasius, 1853

Algeria: 2 f (ISEA 9627, 9628 [S+B]), Aven Yebdar, 13 April 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 28 m, 17 f (ISEA 9625, 9626 [S], 9629–9631, IVB A19–A28, A30, A31, A38, A54–A56, A213, A214, A250, A252, A265, A306–A308, A310, A311, A351, A353, A367–A370, A403, A404, A414, A427, A441, A442, A528, A529 [S+B]), Bejaïa, Aokas, cave, 30 April, 7 and 21 May 1981, 24 March, 23 April, 14 May, 26 June, 25 September, 28 October and 26 November 1982, 25 February, 24 March, 15 April, 16 May and 11 August 1983, leg. J. Gaisler, K. Kowalski & B. Rzebik-Kowalska. – **Bosnia**: 2 m, 2 f (NMW 10809–10812 [S+A]), Poljes near Bilek [= Bileća], 9 March 1893, leg. V. Hawelka. – **Bulgaria**: 1 f (NMP 49804 [S+A]), Bidka, 13 July 1979, leg. D. Holečková, I. Horáček & V. Vohralík; – 5 m, 1 f (NMP 49650 [S+A], 50263–50267 [S+A]), Devenci, Hajduška dupka Cave, 7 July 1975, 14 June 1977, leg. J. Červený, V. Hanák & V. Vohralík; – 4 m, 23 f (NMP 49352, 49353, 49355, 49358, 49359, 49437–49441, 49638, 49652, 49656, 49707, 49749, 49756, 49757, 49762, 49763, 49778, 50247–50253 [S+A]), Karlukovo, 6 July 1975, 3 and 5 July 1976, 12 and 14 June 1977, 6–9 August 1978, leg. V. Bejček, J. Červený, J. Flegr, V. Hanák, F. Pojer, J. Škopek & V. Vohralík; – 1 ind. (NMP 50142 [S+B]), Lakatnik, Suhata peštera Cave, 21 December 1956, leg. V. Beškov; – 2 m, 2 f (NMP 49994, 49995, 50041, 50044 [S+A]), Orehovo, 24 August 1980, 28 and 30 June 1984, leg. D. Král, T. Scholz & V. Vohralík; – 12 m, 15 f (NMP 49991–49993, 50005–50025, 50064, 50065 [S+A], 50033 [S+B]), Ploski, 8 July 1980, 19 July 1981, 16 July 1982, 14 August 1987, leg. J. Flousek, R. Fuchs, D. Holečková, I. Horáček, H. Pragerová, M. Šálek & V. Vohralík; – 5 m, 40 f, 4 ind. (NMP 38564, 38791, 38793, 38795, 49183, 49194–49196, 49199–49201, 49343, 47/72/CA, 47/72/C2, C5, C54–C56, C70, C71, C74, C77, C79, C81, C82, C84–C86, C90–C94, C99–C101, C103, C104, C108, C116, C118–C122, C126, C127, C129 [S+B], Primorsko, 5 June 1957, 17–18 August 1971, leg. V. Hanák, I. Horáček & J. Červený; – 9 m, 13 f, 1 ind. (NMP 49168, 49169, 49171–49175, 49675–49681, 49684, 49685 [S+B], 49170, 49182, 50274–50277, 50284 [S+A]), Sliven, Zmejovi dupki Cave, 27 May 1957, 15 July 1975, leg. J. Červený & V. Hanák; – 1 m (NMP 50055 [S+B]), Spahievo, 16 July 1986, leg. V. Hanzal. – **France**: 1 m (NMW 32106 [S]), Corse, Grotte de Sagone, leg. F. Spitzenberger; – 1 m, 2 f (ZFMK 59.519a–59.519c [S+B]), St. Remy, 5 November 1959, H. Roer. – **Greece**: 1 f (NMW 29716 [S+B]), Archaea Korinth, 6 August 1979, leg. A. Baar & W. Baar; – 8 m, 1 f (NMP 48595–48598, 48604, 48612–48615 [S+B]), Petralona, 28 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 f (NMP 49046 [S+A]), Prespa, Zachariani Cave, 3 September 2001, leg. P. Benda; – 2 f (NMW 45748, 45749 [S+A]), Stavros, 12 July 1979, leg. U. Passauer. – **Iran**: 7 m (SMF 48680–46687 [S]), Mozduran, Khorassan, 4 October 1974, leg. H. Felten, Walch & Wirth. – **Israel**: 1 f (SMF 20454 [S]), Galilee Mts, June 1961, ded. Z. Lev. – **Italy**: 1 m, 1 f (NMW 10803, 10804 [S+A]), Finalborgo, 5 April 1906, leg. A. Gaggero; – 4 m, 1 f (ZFMK 66.364, 66.370, 66.376–66.378 [S+B]), Vico del Gargano, 4 April and 17 September 1961, leg. G. Witte. – **Lebanon**: 1 m (NMP LE92 [S+A]), Er Rouais cave, 26 June 2006, leg. I. Horáček, P. Hulva & R. Lučan; – 4 m, 1 f (AUB M166, M1167–M1170 [S+B]), Mogharet Saleh, 2 km E of Amchite, 18 March 1961, 17 April 1965, leg. R. E. Lewis; – 1 m, 1 f (AUB M160, M163 [S+A]), Roman Aquaduct, 2 km NE Hazmiye, 30 July and 5 August 1960, leg. J. E. Stencel & R. E. Lewis; – 2 f (NMP LE198, LE199 [S+A]), Ras al Assi, monastery, 29 June 2006, leg. I. Horáček, P. Hulva & R. Lučan. – **Morocco**: 2 m (NMW 28065, 28066 [S+B]), Taforalt, Grotte du Chameau Cave, 8 August 1979, leg. E. Hubert, A. Mayer, F. Spitzenberger & J. Wirth. – **Serbia**: 2 m (NMW 15713, 15714 [S+B]), Valjevo, Petnička pećina Cave, 20 October 1972, leg. Đ. Mirić. – **Slovakia**: 13 m, 13 f (NMP 119/58, 120/58, 124/58, 126/58, 131/58, 132/58, 139–143/58, 145/58, 551/59, 552/59, 563/59, J66, J72, J74, J77, J78, J80–82, J87 [S]), Ardovo, Ardovská Cave, 5 February 1958, 29 May 1959, leg. V. Hanák; – 4 f, 2 inds. (NMP 165/58, 594/59, 607/59, 224/61, 110/63, 112/63 [S]), Drienovec, Drienovská Cave, 5 February 1958, 1 June 1959, 17 February 1961, 4 March 1963, leg. V. Hanák; – 1 f (NMP J25 [S]), Jasov, Jasovská Cave, 6 December 1956, leg. V. Hanák; – 2 inds. (NMP unnumbered [S]), Krásna Hôrka, 1970; – 1 ind. (NMP unnumbered [S]), Tisovec, Kostolík Cave. – **Spain**: 1 f (ZFMK 59.518 [S+B]), Malgrat, 2 November 1959, leg. H. Roer; – 2 f (ZFMK 56.725, 56.726 [S+B]), Pyrenees nr. Tremp, 28 May 1955, leg. J. Niethammer; – 2 inds. (ZFMK 96.044, 96.045 [S+Sk]), Deva Valley, between Potes and Balnerio de Arenosillo, leg. J. Niethammer. – **Turkey**: 1 m, 1 f (NMP 47951, 47953 [S+A]), Sergen, Safe Suyu Spring Cave, 1 September 1996, leg. P. Benda, M. Andreas & M. Uhrin. – **Serbia/Romania**: 1 m, 1 ind. (NMW 10813, 19740 [S+B]), Banat, 1853–1855, leg. J. Zelebor.

Rhinolophus mehelyi Matschie, 1901

Algeria: 2 m, 1 f (ISEA 9314, 9317, 9332 [S+B]), Ain Ouarha, 8 January and 2 November 1982, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (MUB A383 [S+B]), Bejaïa, Aokas, cave, 7 January 1983, leg. J. Gaisler; – 2 f (ISEA 9311 [S+B], 9305 [S]), Brezina, cave, 12 February and 30 October 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (ISEA 9306 [S+B]), Houaine, 8 May 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 9 m, 8 f (ISEA 9277, 9278, 9290–9297, 9299, MUB A118, A119 [S+B], ISEA 9289, 9328–9330 [S]), Misserghin nr. Oran, 7 December 1979, 14 March 1980, 20 October 1981, 1 March and 11 May 1982, leg. J. Gaisler, K. Kowalski & B. Rzebik-Kowalska; – 10 m, 6 f (MUB A138, A140, A142–A145, A147, A149–A152, A154–A156, A158 [S+B]), Tiddis nr. Constantine, hot cave, 20 November 1981, leg. J. Gaisler; – 2 m, 1 f (ISEA 9307, 9308, 9335 [S+B]), Sig, 9 May 1981, 25 January 1983, leg. K. Kowalski & B. Rzebik-Kowalska. – **Bulgaria**: 1 ind. (NMNHS unnumbered [S]), Bežanovo, Parnicite Cave, 17 February 1963, leg. P. Beron; – 1 ind. (NMNHS unnumbered [S]), Červen, Zorievica Cave, 31 January 1998, leg. T. Ivanova & B. Petrov; – 1 m (NMNHS, unnumbered [S]), Lesovo, April 1990, leg. P. Stoev; – 1 m (NMNHS N106 [S]), Muselievo, Nanin Kamăk Cave, 10 May 1997, leg. T. Ivanova & B. Petrov; – 3 m, 1 f, 4 inds. (NMNHS N2, unnumbered, RMHR 741, 743, 744 [S]), Pepelina, Orlova Čuka Cave, 4 April 1966, 2 and 16 October 1993, 31 January 1998, leg. T. Ivanova, B. Petrov, A. Stojanov & E. Undžijan; – 1 f (NMNHS N68 [S]), Ribino, Aina-Ini Cave, 21 September 1996, leg. A. Georgieva & T. Ivanova; – 6 m, 1 f (NMP 49176, 49674, 49682, 49683 [S+B], 50279, 50280, 50288 [S+A]), Sliven, Zmejovi dupki Cave, 27 May 1957, leg. V. Hanák, 15 July 1975, leg. J. Červený. – **Greece**: 3 f (NMP 48668–48670 [S+B]), Didimotiho, 22 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (NMP 48672 [S+B]), Kimmeria, mine, 23 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (NMP 48637 [S+B]), 3 km SW of Maronia, Cave of the Cyclops Polyphemos, 18 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 4 m, 1 f (NMP 48591, 48592, 48600, 48602, 48605 [S+B]), Petralona, 28 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík. – **Israel**: 1 f (ZMB 12984 [A]), Jerusalem, 1879, leg. Kersten; – 2 f (ZMB 12978, 12979 [A]), Jerusalem, Adullam Cave, leg. Petermann (including the holotype of *Rhinolophus* (*Euryalus*) *judaicus* Andersen et Matschie, 1904). – **Libya**: 16 m, 4 f (NMP 90236–90255 [S]), Wadi al Kuf, cave, 23 April 1980, leg. V. Hanák & K. Hůrka. – **Romania**: 8 m, 15 f (NMP 90256–90278 [S+B]), Limanu, Pestera de la Limanu, 21 July 1974, leg. J. Červený. – **Turkey**: 1 m (CUP T93/82 [S+A]), Taşkapi, Insuyu Cave, 1 November 1993, leg. P. Benda & I. Horáček; – 1 f (NMP 47961 [S+A]), Sergen, Safe Suyu Spring Cave, 1 September 1996, leg. M. Andreas, P. Benda & M. Uhrin.

Rhinolophus blasii Peters, 1866

Afghanistan: 2 m (SMF 39193, 39194 [S]), Boulah Ghar, Zabul, 27 February 1965, leg. D. Meyer-Oehme; – 1 f (SMF 39182 [S]), Firandjal, Parwan, 2 April 1965, leg. D. Meyer-Oehme; – 1 f (SMF 39183 [S]), Lashkari Bazar, Helmand, 28 August 1965, leg. D. Meyer-Oehme; – 8 m (SMF 39185–39192 [S]), Pashtunkot, Fariab, 27 August 1964, leg. D. Meyer-Oehme (including the holotype of *Rhinolophus blasii meyeroehmi* Felten, 1977); – 1 m (SMF 39184 [S]), Shamshir Ghat, Kandahar, 23 May 1961, leg. D. Meyer-Oehme; – 1 ind. (SMF 42292 [S]), Tschell Ghar, Balkh, 11 April 1965, leg. D. Meyer-Oehme. – **Algeria**: 1 m (MUB A487 [S+B]), Ain Ouarka, cave, 17 July 1983, leg. J. Gaisler; – 9 m, 2 f (MUB A29, A167, A171, A188, A189, A216, A253, A255, A263, A264, A371, [S+B]), Bejaïa, Aokas, cave, 30 April, 10 and 18 December 1981, 24 March, 14 May, 20 June and 26 November 1982, leg. J. Gaisler; – 1 m (MUB A391 [S+B]), Gorges de Kherrata, tunnel, 14 January 1983, leg. J. Gaisler; – 1 m, 1 f (ISEA 10071 [S], MUB A198 [S+B]), Sig, 8 December 1980, 23 November 1981, leg. J. Gaisler, K. Kowalski & B. Rzebik-Kowalska; – 1 m (MUB A221 [S+B]), Souk el Tenine, cave, 23 April 1982, leg. J. Gaisler. – **Bosnia**: 1 m (NMW 10808 [S+A]), Sarajevo, appr. 1891, leg. O. Reisler. – **Bulgaria**: 1 f (NMNHS N54 [S]), Bežanovo, Parnicite Cave, 21 January 1995, leg. T. Ivanova & B. Petrov; – 1 f (NMP 50101 [S+B]), Lakatnik, Tamnata dupka Cave, 10 February 1965, leg. J. Gaisler, V. Hanák & K. Hůrka; – 1 m, 1 f (NMNHS N91, unnumbered [S]), Ribino, Aina-Ini Cave, 11 October 1995, 3 January 1997, leg. A. Georgieva, T. Ivanova, B. Petrov & P. Stoev; – 1 f (NMNHS N40 [S]), Ribino, Samara Cave, 7 July 1995, leg. T. Ivanova; – 2 m, 1 f, 3 ind. (NMNHS, unnumbered [S]), Tarnovci, Karaguk Cave, 1960, leg. P. Beron; – 1 m (NMNHS unnumbered [S]), Trekljano, Jamkata Cave, 29 October 1966, leg. P. Beron. – **Croatia**: 1 m (NMW 28847 [S+B]), Baska, Krk Island, 2 June 1980, leg. E. Christian, M. Christian & A. Mayer; – 1 f (NMW 10806 [S+A]), Monte Promina or Biokovo, before 1884, leg. G. Kolombatović. – **Cyprus**: 2 m (NMW 23381, 23382 [S+B]), between Pyla and Troulli, June–July 1977, leg. K. Kollnberger. – **Greece**: 1 f (NMP 48590 [S+B]), Aidonohori, Aoos River, 28 August 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m, 1 f (NMW 29717, 29718 [S+B], Archaea Korinth, 6 August 1979, leg. A. Baar & W. Baar; – 1 m (NMW 36149 [S+B]), Crete, Katholiko Monastery, Akrotiri Peninsula, 11 September 1986, leg. A. Baar & W. Pölz; – 3 f (NMP 48634–48636 [B]), 3 km SW of Maronia, Cave of the Cyclops Polyphemos, 18 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (NMW 10805 [S+A]), Morea [= Peloponnese], 12 June 1885, leg. E. Reitter; – 4 m, 3 f (NMP 48593, 48594, 48599, 48601, 48603, 48606, 48607 [B]), Petralona, cave, 28 September 1988, leg. V. Hanák, I. Horáček, Z. Roček & V. Vohralík; – 1 m, 3 ind. (NMP 51479–51482 [S+A]), Stoupa, near Kardamili, 7 July 1991, leg. M. Anděra & P. Zbytovský. – **Iran**: 11 m, 2 f (NMP 48098–48110 [S+A]), Emam Sadeh nr. Kashan, 1 May 1997, leg. P. Benda, J. Flegr & J. Sádlová; – 1 f (SMF 46686 [S]), Mozduran, Khorassan, 4 October 1974, leg. H. Felten, Walch & Wirth; – 1 f(?) (SMF 47842 [S]), Tabriz, March 1975, leg. Assadi. – **Morocco**: 10 m, 26 f (NMW 28022–28036 [S+B], 28037–28047, 28049–28058 [S+A]), Fort Tazouguerte, Kef Azigza Cave, 16 August 1979, leg. E. Hubert, A. Mayer, F. Spitzenberger & J. Wirth. – **Turkey**: 1 m, 11 f (CUP T93/84–94 [S+A]), Taşkapi, Insuyu Cave, 1 November 1993, leg. P. Benda & I. Horáček; – 9 m (NMP 47917–47922 [S+A], 90297–90299 [S+B]), Narlikuyu, Cehennem Cave, 2 May 1991, 3 August 1992, leg. P. Benda, J. Flegr, V. Hanzal, P. Horák & J. Sádlová; – 1 m (CUP T93/38 [S]), Sarpdere, Dupnisa Mağara Cave, 16 October 1993, leg. P. Benda & I. Horáček; – 3 m, 4 f (NMP 47952, 47954–47958, 47960 [S+A]), Sergen, Safe Suyu Spring Cave, 1 September 1996, leg. M. Andreas, P. Benda & M. Uhrin. – **Yemen**: 4 m (NMP pb2907–pb2910 [S+A]), Sana'a, Sana Spring, 5 October 2005, leg. P. Benda.

Asellia tridens (Geoffroy, 1813)

Afghanistan: 8 inds. (ZFMK 96.022, 96.023 [S]), cave nr. Kuh-i-Duzd, nr Dilaram, 32° 11' N, 63° 27' E, 1965, leg. J. Niethammer & D. Meyer-Oehme; – 1 f (SMF 39167 [S]), Ebn-e-Yamin, Farah, 2 September 1965, leg. D. Meyer-Oehme. – **Algeria**: 9 m, 2 f (ISEA 9523, 9524, 9527, 9528, 9530, 9532, 9533, MUB A477 [S+B], ISEA 9534 [S], 9526, 9531 [B]), Ain Ouarka, 20 May 1982, leg. K. Kowalski, B. Rzebik-Kowalska & J. Gaisler; – 2 m, 1 f (ISEA 9522, 9534, 9535 [S+B]), Benni Abbes, 15 May 1981, 19 July 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (ISEA 9536 [S+B]), Brezina, 23 July 1983, leg. K. Kowalski & B. Rzebik-Kowalska. – **Egypt**: 2 m (IVB 22, 27 [S+B]), Dandara, temple, 27 April 1969, leg. J. Gaisler; – 1 m (MNHN 1986-1068 [S+B]), Egypte [= Thebes], leg. E. Geoffroy Saint-Hilaire (lectotype of *Rhinolophus tridens* Geoffroy, 1813); – 3 inds. (NMP 90351, 90352, 90354 [S+A]), Siwa oasis, 12 April 2002, leg. P. Munclinger & P. Nová; – 17 m, 2 ind. (IVB 30, 31, 33–36, 38–43, 45–51 [S+B]), Thebes, tombs, 30 April 1969, leg. J. Gaisler. – **Iran**: 5 m, 10 f, 6 inds. (NMP 48173–48187 [S+A], JOC unnumbered [S+Sk]), Choqa Zanbil, 15 October 1998, leg. P. Benda, J. Obuch & M. Uhrin. – **Iraq**: 8 f (NMW 21994, 21996–22002 [S+A]), Mosul, 5 December 1910, leg. S. Hassoun. – **Isreal**: 1 f (SMF 18987 [S]), Jaffa, ded. Z. Lev. – **Libya**: 1 f (NMP 48317 [S+A]), Ghat, 3 October 1999, leg. P. Benda. – **Saudi Arabia**: 4 f (SMF 80445–80448 [S]), Massullamiyah Cliff, 27° 24' N, 49° 14' E, N of al-Jubail, al-Sinaiyah, Eastern Prov., 28 May 1992, D. Kock & I. A. Nader. – **Sudan**: 2 m, 2 f (ZFMK 97.001–97.003, 97.005 [S+Sk+B]), Djebel, ca. 30 km NW of Khartoum, 15° 33' N, 32° 32' E, 18 March 1986, leg. J. Niethammer; – 2 m, 7 f, 6 inds. (IVB 1–9 [S+B], NMP 90344–90349 [S+A]), Jebel el Azraq, 18 February 1966, leg. P. Štys. – **Tunisia**: 24 m (MUB 1.2.75–1.2.98 [S+B]), El Hammá, nr. Tozeur, autumn 1973, leg. Pavlík.

Myotis myotis (Borkhausen, 1797)

Albania: 4 m, 7 f (NMP B59, B60, B63, B68–B70, B73, B77, B79, B82, B180 [S+B]), Tepelene, Mezhgoranit Cave, 11 October 1960, leg. V. Hanák; – 3 m, 1 f (NMP B183, B185, B187, B188 [S+B]), Vanista, Gjirokastra, cave, 12 October 1960, leg. V. Hanák. – **Bulgaria**: 2 m, 1 f (NMP 49801, 49805, 49785 [S+A]), Bačkovski Monastery, 21 and 23 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 2 m (NMP 49802, 49803 [S+A]), Bačkovo, Marciganica Hut, 23 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 1 m (IVB 71 [S+B]), Beloslav, Temnata dupka Cave, 9 September 1962, leg. J. Gaisler; – 1 f (NMP 47/72/C42 [S+B]), Čepelare, 7 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 4 m, 1 f (NMP 49642–49646 [S+A]), Devenci, Hajduška dupka Cave, 14 June 1977, leg. V. Bejček, J. Škopek, P. Vašák & V. Vohralík; – 1 m (NMP 47/72/C31 [S+B]), Jagodina, 2 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 6 m, 6 f (NMP 49653, 49655, 49754, 49755, 49760, 49761, 49767, 49769–49771 [S+A], IVB 76, 77 [S+B]), Karlukovo, 3 October 1962, 14 June 1977, 8 and 9 August 1978, leg. V. Bejček, P. Donát, J. Flegr, J. Janda, J. Škopek, P. Vašák & V. Vohralík; – 2 m, 2 f (NMP 49640, 49641, 49744, 49745 [S+A]), Karlukovo, Prochodnata peštera Cave, 13 June 1977, 7 August 1978, leg. V. Bejček, P. Donát, J. Flegr, J. Janda, J. Škopek, P. Vašák & V. Vohralík; – 4 m (NMP 49747, 49748, 49751, 49752 [S+A]), Karlukovo, Temnata dupka Cave, 7 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 1 m, 1 f (NMP 50141, IVB 129 [S+B]), Lakatnik, 14 October 1956, 10 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 5 f (NMP 50126–50129, IVB 75 [S+B]), Lakatnik, Suhata peštera Cave, 30 September 1962, 10 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 m, 1 f (NMP 50102, 50104 [S+B]), Lakatnik, Temnata dupka Cave, 10 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 m (IVB 128 [S+B]), Malka Brestnica, 8 February 1962, leg. J. Sklenář; – 10 m (NMP 50081–50090 [S+B]), Malka Brestnica, Saeva dupka Cave, 8 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 2 m, 2 f (IVB 73, 74, NMP 50073, 50074 [S+B]), Peštera, Novata peštera Cave, 18 September 1962, 4 and 5 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 4 f (NMP 50075, 50077–50079 [S+B]), Peštera, Snežanka Cave, 5 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 2 m, 1 f (IVB 127, NMP 49431, 49432 [S+A]), Ploski, cave, 10 July 1976, leg. M. Braniš, V. Hanák, I. Horáček, K. Hůrka, J. Jirouš, V. Švihla & V. Vohralík; – 3 m (NMP 50052–50054 [S+A]), Spahievo, 14 July 1986, leg. V. Hanzal, K. Hůrka, P. Musil, M. Průcha, M. Šálek, V. Vohralík & K. Weidinger; – 2 m (NMP 50096, 50097 [S+B]), Zlatna Panega, Panežka dupka Cave, 8 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka. – **Czech Republic**: 1 f (IVB 16 [S+B]), Běleč u Hradce Králové, school attic, 23 May 1955, leg. J. Gaisler; – 2 m (CUP NH482, NH957 [S+B]), Benešov nad Černou, church, 8 August 1969, 3 June 1971, leg. M. Anděra & V. Vohralík; – 2 f (IVB 108, 109 [S+B]), Blansko, church attic, 21 May 1963, leg. J. Gaisler; – 2 f (IVB 14, 15 [S+B]), Brno, church attic, 20 July 1955, leg. J. Gaisler; – 3 m, 9 f (IVB 6, 54–58, 60, 61, 63–66 [S+B]), Býčí skála Cave, 15 February 1958, 17 March and 17 April 1962, leg. J. Gaisler; – 20 f (IVB 96–107, 110–117 [S+B]), Černá Hora u Rájce, church attic, 7, 14 and 21 May 1963, leg. J. Gaisler; – 1 m (IVB 38 [S+B]), Dobřenice u Hradce Králové, church tower, 14 September 1954, leg. J. Gaisler; – 6 f, 1 ind. (NMP 466/58, 467/58, 486/58, 635/58, 642/58, 648/58, 485/59 [S+B]), Dobřichovice, monastery attic, 4 May,1 June and 31 July 1958, 3 May 1959, leg. J. Sklenář & K. Hůrka; – 5 m, 12 f (NMP E110, E113, E115–E117, E129–E134, E191, E192, E199, E209, T69, T99 [S+B]), Domažlice, church attic, 25 April 1956, 25 April, 30 May and 25 July 1957, leg. V. Hanák, K. Hůrka & J. Hůrková; – 2 f (IVB 36, 37 [S+B]), Dvůr Králové, city hall attic, 5 June 1954, leg. J. Gaisler; – 1 f (IVB 9 [S+B]), Frenštát pod Radhoštěm, church tower, 21 August 1954, leg. P. Verner; – 3 inds. (NMP 799/58–801/58 [S+B]), Hlavice u Českého Dubu, 28 September 1958, leg. B. Král; – 1 m (IVB 12 [S+B]), Hradec Králové, city centre, December 1954, leg. J. Gaisler; – 1 f (NMP 12/67 [S+B]), Jemniště u Benešova, cellar, 11 January 1967, leg. V. Hanák; – 2 f (NMP 1172, 1173 [S+B]), Kardašova Řečice; – 1 f (IVB 23 [S+B]), Kašperské Hory, mines, 18 March 1956, leg. J. Gaisler; – 1 ind. (NMP 3/84 [S]), Kladno; – 1 m (NMP 47/68 [S+B]), Kolín, house attic, 3 September 1968, leg. V. Hanák; – 1 f (MUB 1.5.13 [S+B]), Květnice u Tišnova, mine, 2 February 1987, leg. J. Gaisler; – 2 m (NMP P18, P20, P21 [S+B]), Ledce u Mladé Boleslavi, forestry attic, 17 August 1957, leg. V. Hanák; – 1 m (NMP 679/59 [S+B]), Lidečko, church attic, 5 June 1959, leg. V. Hanák & K. Hůrka; – 5 f (IVB 88–92 [S+B]), Lomnice u Tišnova, castle attic, 7 June 1963, leg. J. Gaisler; – 1 f (NMP E210 [S+B]), Lomnice nad Lužnicí, Velký Tisý Fishpond, 23 August 1957, leg. V. Hanák; – 3 m, 4 f (IVB 67, 78, 119, 120, 132, 133, MUB 1.1.58 [S+B]), Macocha, Erichova Cave, 26 February and 8 December 1963, 24 February 1966, 12 February 1970, leg. J. Gaisler; – 1 m, 2 f (MUB 1.1.115, 1.2.53, 1.2.54 [S+B]), Malá Morávka, mines, 28 February 1972, 9 February 1974, leg. J. Gaisler; – 1 m (IVB 8 [S+B]), Mikulov, church attic, 29 May 1958, leg. J. Gaisler; – 18 f (NMP 478/58, 480/58–485/58, 487/58–497/58 [S+B]), Mníšek pod Brdy, 1 June 1958, leg. J. Sklenář; – 5 f (IVB 83–87 [S+B]), Moravský Krumlov, castle attic, 22 May 1963, leg. J. Gaisler; – 3 f (IVB 20, NMP 474/58, 475/58 [S+B]), Mořina, Amerika mine, 23 October 1955, 26 April 1958, leg. J. Gaisler & V. Hanák; – 1 f (NMP F7 [S+B]), Na pomezí Cave, 20 November 1955, leg. J. Figala; –1 f (NMP 2/91 [S]), Pecka Castle; – 2 m, 2 f (IVB 18, 42, 43, 46 [S+B]), Pištín, church attic, 10 September 1955, leg. J. Gaisler; – 13 f, 1 ind. (NMP 1168–1171, 1174–1183 [S+B]), Praha (undef.); – 1 ind. (NMP 195/58 [S+B]), Praha-Troja, house cellar, 18 February 1958, leg. V. Hanák; – 3 m, 1 f (NMP 946/58, 948/58, 950/58, E261 [S+B]), Rabí, castle cellar, 16 December 1958, leg. V. Hanák; – 1 m (NMP 37/73 [S+B]), Radkov u Svitav, 25 April 1973; – 4 f (IVB 10, 93–95 [S+B]), Rájec nad Svitavou, church attic, 13 June 1959, 7 May 1963, leg. J. Gaisler; – 1 f (NMP 367/58 [S+B]), Rájek u Kadaně, mine, 13 March 1958, leg. V. Hanák; – 1 f (NMP 788/58 [S+B]), Rataje nad Sázavou, house attic, 20 August 1958, leg. V. Hanák; – 1 m, 1 f (NMP N209, N210 [S+B]), Sádek u Třebíče, castle attic, 18 August 1957, leg. P. Hanák; – 1 m, 1 f (IVB 44, 45 [S+B]), Sedlec, church attic, 10 September 1955, leg. J. Gaisler; – 2 m, 1 f (IVB 122, 123, NMP 363/59 [S+B]), Sloup, Sloupsko-šošůvské Cave, 1 February 1959, 25 November 1962, leg. J. Gaisler, V. Hanák & K. Hůrka; – 1 f (MUB 1.4.28 [S+B]), Sněžné v Orlických horách, Portál mine, 26 September 1979, leg. J. Gaisler; – 3 m, 4 f (IVB 24, 27, 29, NMP 473/58, 39/71, 40/72, unnumbered [S+B]), Srbsko, mine, 24 January 1957, 13 April 1958, leg. J. Gaisler, V. Hanák & I. Horáček; – 1 f (IVB 3 [S+B]), Stěžery u Hradce Králové, 3 July 1955, leg. J. Gaisler; – 6 f (NMP 478/58–480/58, 735/58, 743/58, 744/58 [S+B]), Stráž nad Nežárkou, church tower, 18 May, 7 August 1958, leg. V. Hanák; – 1 f (MUB 1.5.12 [S+B]), Svařec u Žďáru nad Sázavou, Doležalova mine, 6 March 1987, leg. J. Gaisler; – 2 m, 13 f, 2 inds. (NMP 484/58–489/58, 507/58, 509/58, 603/58, 682/58, 685/58, 686/58, 759/59–763/59 [S+B]), Třeboň, monastery attic, 1 and 15 June, 13 July, 3 August 1958, 5 July 1959, leg. V. Hanák; – 4 f (NMP 842/59, 844/59, 849/59, 859/59 [S+B]), Ústí nad Labem, church attic, 27 July 1959, leg. J. Figala & V. Hanák; – 2 f (NMP 676/59, 677/59 [S+B]), Valašské Klobouky, house attic, 5 June 1959, leg. V. Hanák & K. Hůrka; – 1 m (IVB 11 [S+B]), Valtice, castle attic, 18 June 1958, leg. J. Gaisler; – 2 f (IVB 68, 69 [S+B]), Veveří Castle, chamber, 2 May 1962, leg. J. Gaisler; – 2 f (NMP 106/65, 110/65 [S+B]), Vřesce u Tábora, mine, 18 March 1965, leg. M. Anděra, V. Hanák & P. Zbytovský; – 1 m (NMP 20/87 [S+B]), Žinkovy u Klatov, 8 May 1987; – 1 m (CUP NH4263 [S+B]), Žofín, mow attic, 28 April 1974, leg. V. Vohralík; – 1 m, 2 f, 1 ind. (NMP 832/58, 840/58, 846/58, 860/58 [S+B]), Zvíkov, castle attic, 1 October 1958, leg. V. Hanák. – **Greece**: 6 m (NMP 48620, 48673, 48675–48677 [S+B], 48619 [S]), Kimmeria, upper mine, 16 and 23 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (NMP 48558 [S+B]), Olympos Mts, Prionia, 1100 m, 17 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 6 f (MHNG 1713.031–1713.034, 1713.038, 1713.039 [S+A]), Kastria, 17 May 1974, leg. P. Strinati; – 2 m (MHNG 1807.094, 1807.095 [S+A]), Lesvos, Plomari, Agios Isidoros, 12 September 2000, leg. M. Ruedi; – 1 f (MHNG 1808.008 [S+A]), Lesvos, Polihnitos, Vasilika, 13 September 2000, leg. M. Ruedi. – **Lebanon**: 4 m, 3 f (AUB M182–M185, M188, M190, BMNH 61.403. [S+B]), Mogharet Saleh Cave, 2 km E of Amchite, 14 August 1960, leg. R. E. Lewis (including the holotype of *Myotis myotis macrocephalicus* Harrison et Lewis, 1961). – **Poland**: 2 m, 4 f (NMP pb273–pb278 [S+A]), Nietoperek, February 1992, leg. P. Benda. – **Portugal**: 1 m, 1 f (MHNG 1716.004, 1716.005 [S+A]), Fojo dos Morcegos, Acafora, 20 km N of Sintra, 21 May 1961, leg. K. Lindberg; – 1 m, 6 f (1715.097–1715.100, 1716.001–1716.003 [S+A], Lapa dos Morcegos, Cote de l'Arrabida, 28 May 1961, leg. K. Lindberg. – **Slovakia**: 2 m, 3 f (NMP 136/58, 146/58–148/58 [S+B]), Ardovo, Ardovská Cave, 5 February 1958, leg. V. Hanák; – 1 f (NMP 149/61 [S+B]), Červená Skala, Ladzianského Cave, 15 February 1961, leg. J. Gaisler, V. Hanák & K. Hůrka; – 2 m, 2 f (IVB 47–49, 51 [S+B]), Chľaba u Štúrova, church attic, 14 August 1955, leg. J. Gaisler; – 4 f (NMP 112/61, 123/61, 125/61, 127/61 [S+B]), Demänovská Dolina, Dračia Ice Cave, 14 February 1961, leg. J. Gaisler, V. Hanák & K. Hůrka; – 1 m (NMP J188 [S+B]), Domica, Čertova diera Cave, 10 February 1956, leg. V. Hanák et al.; – 7 m, 10 f (IVB Ga1686–Ga1695, 7712/104, 105, 107, 109, 112, 114, 117 [S+B]), Domica, Domica Cave, 9–13 April 1957, leg. M. Jurík & F. Tenora; – 3 f (IVB 82, MUB 1.1.42, NMP 166/58 [S+B]), Drienovec, Drienovecká vyvieračka Cave, 6 February 1958, 5 March 1963, 11 August 1965, leg. J. Gaisler & V. Hanák; – 1 m, 2 f (NMP 669/59, 671/59, 672/59 [S+B]), Dubnica nad Váhom, 5 June 1959, leg. V. Hanák & K. Hůrka; – 2 m, 7 f (NMP J196, J198, J199, J201, J203, J205–J208 [S+B]), Gombasek, Ludmila Cave, 11 December 1956, leg. V. Hanák et al.; – 1 m, 1 f (NMP 176/58, 182/58 [S+B]), Hačava, Hačavská Cave,7 February 1958, leg. V. Hanák; – 16 m, 10 f (IVB 79, 81, NMP 100/61, HAR3–HAR5, HAR8–HAR13, HAR15, HAR16, HAR20–HAR24, HAR26, HAR30, HAR33, HAR38–HAR40, HAR51 [S+B]), Harmanec, Izbica Cave, 12 February 1961, 28 February 1963, leg. J. Gaisler, V. Hanák & K. Hůrka; – 1 f (NMP 464/58 [S+B]), Kováčov u Štúrova, mine, 15 April 1958, leg. J. Figala & V. Hanák; – 1 f (MUB 1.1.55 [S+B]), Ružomberok, Lieskovská Cave, 6 February 1970, leg. J. Gaisler; – 1 m, 1 f (NMP 184/61, 187/61 [S+B]), Tisovec, Netopierov Cave, 16 February 1961, leg. J. Gaisler, V. Hanák & K. Hůrka; – 4 f (IVB 124–126, 130 [S+B]), Velké Leváre u Malacek, castle attic, 28 May and 23 October 1964, 17 May 1965, leg. J. Gaisler; – 1 f (IVB 118 [S+B]), Zuberec, Brestovská Cave, 26 September 1963, leg. J. Gaisler. – **Spain**: 2 m (MHNG 1805.063, 1805.064 [S+A]), Barcelona, Malgrat, leg. M. Ruedi; – 2 f (ZFMK 56.727, 56.728 [S+B]), nr. Tremp, Perenees, 28 May 1955, leg. J. Niethammer; – 8 m (ZFMK 35.87, 53.103, 50.500, 50.501, 59.447, 60.146, 61.210, 61.211 [S+B]), Salamanca, Linares de Riofrio, 27 June 1935, 12 August 1953, 20 September and 2 October 1955, 15 August 1959, 7 May 1960, 25 April 1961, leg. H. Grün. – **Turkey**: 1 m (CUP T93/62 [S+A]), Derebük, tunnel, 27 October 1993, leg. P. Benda & I Horáček; – 3 m (MHNG 1713.074–1713.076 [S+A]), Harbiye Cave, 24 June 1953, leg. K. Lindberg; – 1 m (ZFMK 58.277 [S]), Kizil, Tabya, Taurus (= Kizil Dağ, S Niğde), 9 August 1953; – 1 m (MHNG 1718.091 [S+A]), Narlica Cave, 1956, leg. K. Lindberg; – 1 m, 1 f (CUP T93/14–15 [S+A]), Sarpdere, Dupnisa Mağara Cave, 16 October 1993, leg. P. Benda & I Horáček; – 1 m (ZFMK 72.139 [S]), Sehe Gölü, Müçür (= Sife Gölü, Mucur), 24 April 1972; – 2 m (MHNG 1714.008 [S+A], 1714.014 [S]), Sogucak, Yalova, 15 June 1952, leg. K. Lindberg; – 1 f (HSC 69/4 [S+A]), Akçaabat, W of Trabzon, 4 April 1969, leg. H. M. Steiner; – 4 inds. (HMS CAM 2–5 [S]), Çamlimağara Cave, 10 September 1969, leg. H. M. Steiner.

Myotis blythii (Tomes, 1857)

Afghanistan: 1 f (ZFMK 97.138 [S]), cave above Maindar Valley, 2700 m, 20 km E of Unai-Pass, 30 April 1965, leg. J. Niethammer; – 1 m (MHNG 952.98 [S+A]), Finidjal, W of Kabul, 29 July 1957, leg. K. Lindberg; – 2 inds. (MHNG

974.7, 974.8 [S+Sk]), Maimaneh, Grotte Zarmast, 5 July 1959, leg. K. Lindberg; – 1 ind. (MHNG 953.2 [S]), Qalat, Grotte Boulan, 9 April 1958, leg. K. Lindberg. – **Albania**: 1 m, 5 f (NMP B64, B66, B67, B75, B76, B78 [S+B]), Tepelene, Mezhgoranit Cave, 11 October 1960, leg. V. Hanák. – **Armenia**: 1 m (NMP SA333 [S+B]), Erevan, 1989, leg. D. Frynta. – **Azerbaijan**: 1 m, 1 ind. (NMP 91423, 91436 [S+B]), Gobustan, mine, 20 June 1986, 22 June 1987, leg. D. Frynta & M. Švátora; – 6 m, 4 ind. (NMP 91298, 91301, 91302, 91308–91310 [S+A], 91427, 91429–91431 [S+B]), Şemaxa, 26 and 28 June 1979, 5 July 1986, leg. D. Frynta & I. Rehák; – **Bulgaria**: 1 m (NMP 40692 [S+B]), Beloslav, 4 September 1966, leg. B. Pražan; – 1 m (NMP 47/72/C19 [S+B]), Gela, 31 July 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 2 m (NMP 50047, 50048 [S+A]), Kamen Brjag, 11 July 1976, leg. M. Braniš, V. Hanák, I. Horáček, K. Hůrka, J. Jirouš, V. Švihla & V. Vohralík; – 2 m, 1 f (NMP 49364, 49365, 49654 [S+A]), Karlukovo, 6 July 1976, 14 June 1977, leg. V. Bejček, M. Braniš, V. Hanák, I. Horáček, K. Hůrka, J. Jirouš, J. Škopek, V. Švihla, P. Vašák & V. Vohralík; – 2 m (IVB 7, 8 [S+B]), Kavarna, 11 September 1962, leg. J. Gaisler; – 1 m (NMP 50204 [S+A]), Mala Deško, 11 July 1958, leg. K. Hůrka; – 3 m, 14 f (NMP 49185, 49187, 49188, 49202–49204, 49212, 49213, 49215, 49217, 49219, 49225, 49230, 49342, 49345 [S+A], 49705, IVB 81 [S+B]), Primorsko, Maslennos, 5 June 1957, 27 August 1961, leg. J. Gaisler, V. Hanák, B. Král & P. Pithart; – 3 m (NMP 49791, 49792 [S+A], 40920 [S+B]), Sliven, 13 July 1979, 10 June 1982, leg. D. Frynta, D. Holečková, P. Donát, I. Horáček, J. Jirouš, H. Prágerová & V. Vohralík. – **Cyprus**: 1 m (NMP 90426 [S+A]), 4 km SE of Çinarli, Inçirli Cave, 17 April 2005, leg. P. Benda, V. Hanák & I. Horáček; – 1 m (NMP CH226 [S+A]), Troodos Forest, 4.5 km SW of Kakopetria, mine, 14 October 2005, leg. I. Horáček, P. Hulva & R. Lučan. – **Czech Republic**: 1 f (IVB 6 [S+B]), Býčí skála Cave, 17 March 1962, leg. J. Gaisler; – 1 f (IVB 3 [S+B]), Javoříčské jeskyně Cave, 11 February 1958, leg. J. Gaisler; – 1 m (MUB 1.1.60 [S+B]), Josefovské Valley, Kanibalka Cave, 18 April 1970, leg. J. Gaisler; – 1 f (MUB 1.4.25 [S+B]), Lednice, castle, 19 June 1979, leg. J. Gaisler; – 1 m (IVB 18 [S+B]), Macocha, Erichova Cave, 9 January 1968, leg. J. Gaisler; – 1 f (IVB 1644 [S+B]), Mikulov, Na Turoldu Cave, 20 February 1968, leg. J. Gaisler; – 1 m, 1 f (IVB 4 [S+B]), Milovice u Mikulova, church attic, 19 June 1958, leg. J. Gaisler; – 1 m (NMP 345/58 [S]), Moravian Karst (undef.); – 1 f (IVB 2 [S+B]), Ochozská Cave, 3 December 1957, leg. J. Gaisler; – 1 m (NMP 364/59 [S]), Sloup, Sloupské Cave, 1 February 1959, leg. J. Gaisler, V. Hanák & K. Hůrka. – **Georgia**: 2 m (NMP SA8, SA9 [S+B]), Mcchata-Sveticchovali nr. Tbilisi, 11 July 1964, leg. V. Hanák. – **Greece**: 4 f (MHNG 1807.068, 1807.069, 1808.005, 1808.006 [S+A]), Crete, Ano Viannos, August 1999, leg. R. Arlettaz; – 1 m, 1 f (MHNG 1713.081, 1713.083 [S+A]), Crete, Grotte de Milatos, 12 May 1955, leg. K. Lindberg; – 1 m, 2 f (ZFMK 78.242–78.244 [S]), Crete (undef.); – 3 f (ZFMK 83.403–83.405 [S+B]), Elomohoriou, Lakonia, 20 June 1966, leg. I. Iliopoulou; – 1 m, 6 f (MHNG 1713.040, 1713.043–1713.046 [S+A], ZFMK 83.401, 83.402 [S+B]), Kastria, 17 May and 2 July 1974, leg. P. Strinati & I. Iliopoulou; – 4 m (NMP 48617, 48618, 48621, 48674 [S+B]), Kimmeria, 16 and 23 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f, 1 ind. (MHNG 1807.099 [S+A], 1807.100 [S+Sk]), Lesvos, Efthalou, 14 September 2000, leg. M. Ruedi; – 2 m, 3 f (ZFMK 83.406–83.410 [S+B]), Lesvos, Mithymna, 1 June 1965, leg. I. Iliopoulou; – 1 f (NMP 48559 [S+B]), Olympos Mts, Prionia, 1100 m, 17 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 f (NMP 48580 [S]), Papigo, Timphi Mts, 26 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík. – **India**: 1 m (BMNH 71.14 [S+A]), Bahmajo Bat Cave, 6 miles from Achabal, Kashmir, 5,700 ft, leg. G. LePatourel; – 1 m (BMNH 20.4.24.1. [S]), Balna, W Kumaon, leg. H. L. Tyter; – 1 f (ZFMK 97.137 [S]), Kashmir, Srinagar, August 1962, leg. E. Kollmann; – 1 ind. (BMNH 49.8.16.22. [S+B]), Nurshabad, leg. Warwick (holotype of *Vespertilio blythii* Tomes, 1857); – 1 ind. (BMNH 13.10.16.1. [S+A]), Swinla/Simla Dist. (?), leg. P. Dodsworth. – **Iran**: 9 inds. (JOC unnumbered [S+Sk]), Abshahr, 3 May 1996, leg. J. Obuch; – 2 m, 12 f (ZIN 11227, 11234, 11257, 11275, 11276, 11292, 11294, 11307–11310, 11316, 11325, 11326 [S+A]), Astrabad, April–June 1914, leg. Kiričenko; – 10 m (NMP 48353–48362 [S+A]), Deh Bakri, 7 April 2000, leg. J. Obuch & A. Reiter; – 1 m (BMNH 5.10.4.14. [S+B]), Derbend, 6500 ft, 60 miles W of Isfahan, 14 May 1905, leg. R. Woosnam (holotype of *Myotis myotis omari* Thomas, 1906); – 4 f (NMP 48459–48462 [S+A]), Firuz Abad, 21 April 2000, leg. P. Benda & A. Reiter; – 4 inds. (HSC MOZ 1–4 [S]), Mazdooran, 17 August 1968, leg. H. M. Steiner; – 1 m (BMNH 20.2.9.18. [S+B]), Shiraz, leg. J. E. B. Hotson (holotype of *Myotis myotis risorius* Cheesman, 1921); – 9 m, 1 f (NMP 48131–48137, 48142–48144 [S+A]), Tahkt-e Suleiman, 3 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin. – **Kirghizstan**: 1 f (CUP CT 84/254 [S+A]), Aravan, Čarvak, cave, 20 August 1984, leg. J. Červený & I. Horáček; – 1 m (CUP CT 84/255 [S+A]), Aravan, Duvahan Ungur Cave, 21 August 1984, leg. J. Červený & I. Horáček; – 2 m, 1 f (CUP CT 84/279–281 [S+A]), Aravan, Sasyk Unkur Cave, 24 August 1984, leg. J. Červený & I. Horáček; – 9 m, 5 f (CUP CT 84/361–374 [S+A]), Nižnaja Serfimovka, Soljanka Cave, 29 August 1984, leg. J. Červený & I. Horáček; – 1 m (CUP CT 84/324 [S+A]), Oš, Mt. Sulejman, 26 August 198, leg. J. Červený & I. Horáček; – 9 m (CUP CT 84/67–69, CT 84/116–118, CT 84/246–248 [S+A]), Oš, Tuja Mujun, mine, 2, 6 and 19 August 1984, leg. J. Červený & I. Horáček; – 27 m, 30 f (CUP CT 84/97–112, CT 84/129–162, CT 84/164–169 [S+A]), Oš, Tuja Mujun, Adžidar Ungur Cave, 5 and 8 August 1984, leg. J. Červený & I. Horáček; – 8 f, 7 f (CUP CT 84/205–219 [S+A]), Oš, Tuja Mujun, Barytovaja Cave, 9 August 1984, leg. J. Červený & I. Horáček; – 1 f (CUP CT 84/233 [S+A]), Sujčikty, Kara Goj, cave, 3000 m, 14 August 1984, leg. J. Červený & I. Horáček. – **Lebanon**: 1 m, 1 f (AUB M174, M176 [S+B]), Natural Bridge, 7 km E of Faraya, 21 and 29 July 1960, leg. R. E. Lewis. – **Portugal**: 1 m (MHNG 1805.046 [S]), Sud Portugal, June 1991, leg. R. Arlettaz. – **Romania**: 1 m (NMP RO69 [S+B]), Pestera de la Adam, 18 July 1977, leg. J. Červený; – 1 m, 2 f (NMP RO38, RO39, RO55 [S+B]), Pestera de la Gura Dobrogei, 17 July 1977, leg. J. Červený. – **Slovakia**: 1 m, 1 f (MUB 1.1.90, 1.1.91

[S+B]), Červená Skala, Ladzianského Cave, 10 February 1971, leg. J. Gaisler; – 1 f (IVB 1 [S+B]), Chľaba u Štúrova, church attic, 14 August 1955, leg. J. Gaisler & V. Hanák; – 2 m, 1 f (NMP 158–160/58, 162/58 [S+B]), Drienovec, Drienovecká Cave, 6 February 1958, leg. J. Gaisler, V. Hanák & K. Hůrka; – 4 m, 5 f (NMP 173/58, 174/58, 177–181/58, 184/58, 185/58 [S+B]), Hačava, Hačavská Cave, 7 February 1958, leg. V. Hanák & K. Hůrka; – 27 m, 27 f (IVB 5, 9, 10, NMP 857–867/58, 57–59/63, 61–68/63, 70–77/63, 80/63, HAR6, HAR7, HAR14, HAR17–HAR19, HAR25, HAR27–HAR29, HAR32, HAR34, HAR36, HAR37, HAR41, HAR45, HAR46, HAR48–HAR50 [S+B]), Harmanec, Izbica Cave, 20 December 1958, 12 February 1961, 28 February 1963, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 m (NMP 569/59 [S+B]), Hrhov, church attic, 31 May 1959, leg. J. Sklenář; – 1 m, 1 f (NMP J7, J11 [S]), Jasov, Jasovská Cave, 8 December 1956, leg. V. Hanák; – 1 f (NMP J184 [S]), Kečovo, 10 December 1956, leg. V. Hanák; – 2 m, 2 f, 2 inds. (NMP 792/58, 796–798/58, 803/58, 804/58 [S+B]), Mýto pod Ďumbierom, church attic, 4 September 1958, leg. J. Figala & V. Hanák; – 2 f (IVB 14, 15 [S+B]), Plavecké Podhradie, cave, 28 May 1964, leg. J. Gaisler; – 1 m, 2 f (MUB 1.1.56, 1.2.2, 1.2.3 [S+B]), Ružomberok, Lieskovská Cave, 6 February 1970, 8 February 1973, leg. J. Gaisler; – 1 m (IVB 11 [S+B]), Tatranská Basin, Belanská Cave, 1 March 1964, leg. J. Gaisler; – 1 f (MUB 1.1.46 [S+B]), Tribeč, Gýmeš Castle ruins, 1 July 1966, leg. J. Gaisler; – 4 f (IVB 12, 13, 16, 17 [S+B]), Velké Leváre u Malacek, castle attic, 28 May 1964, leg. J. Gaisler. – **Spain**: 1 f (MNHG 1805.041 [S+A]), Barcelona, Malgrat, leg. M. Ruedi; – 1 m (ZFMK 61.56 [S+B]), Linares de Riofrio, 30 July 1960, leg. H. Grün; – 1 f (ZFMK 56.729 [S+B]), nr. Tremp, Perenees, 28 May 1955, leg. J. Niethammer; – 1 f, 1 ind. (MHNG 1805.048 [S+A]), Tarifa Espagne, 20 August 1993, leg. R. Arlettaz. – **Tajikistan**: 1 ind. (ZIN 32277 [S]), Kuljab, July 1941/1943, leg. B. Vinogradov & S. Stroganov; – 1 m (ZIN 24389 [S]), N slope of the Tissarskij Range, kišlak Kzyl-Tam, 18 July 1933, leg. Vel'giščev. – **Turkey**: 2 inds. (HSC CAM 1, 6 [S]), Çamlimağara Cave, 10 September 1969, leg. H. M. Steiner; – 1 m, 4 f (HSC 67/285–289 [S+A]), Erdek, cave, 7 October 1967, leg. H. M. Steiner; – 1 m (NMP 47903 [S+A]), Muradiye, 27 July 1992, leg. P. Benda; – 6 m, 2 f (CUP T93/10–13, T93/40–43 [S+A]), Sarpdere, Dupnisa Mağara Cave, 16 and 17 October 1993, leg. P. Benda & I. Horáček; – 5 m, 2 f (HSC 67/261–267 [S+A]), Tuzluca, 14 September 1967, leg. H. M. Steiner; – 4 m (NMP 47905–47908 [S+A]), Van, 28 July 1992, leg. P. Benda; – 1 m (NMP 90421 [S+A]), Elaman Hani nr. Tatvan, 30 June 2003, leg. J. Hájek & J. Hotový. – **Turkmenistan**: 7 m, 12 f (NMP SA93, SA107, SA108, SA110, SA111, SA131–SA135, SA138–SA146 [S+B]), Bahardenskaja Cave, 29 July 1964, leg. V. Hanák; – 7 f (ZIN 63915–63921 [S]), E Kopet-Dag, 18 km S of the Dušak Station, Kelat Cave, 20 May 1967, leg. K. Babaev; – 2 inds. (ZIN 48479, 48480 [S]), Murgab Valley, Tahta-bazar, 25 June 1930, leg. K. Flerov. – **Uzbekistan**: 4 m (NMP SA327–SA330 [S+B]), Amankutan, 9 June 1989, leg. D. Frynta; – 1 m, 1 f (NMP BB1, BB2 [S+B]), Samarkand, 28 September 1963, leg. V. Hanák.

Myotis nattereri (Kuhl, 1817)

Algeria: 1 f (MUB A187 [S+B]), Bejaïa, Aokas, cave, 18 December 1981, leg. J. Gaisler; – 12 m, 6 f (ISEA 1307–1313, 1317, 1319–1328 [S+B]), Fezza, 13 April 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 f (MUB A339 [S+B]), Yakouren, Vilaye de Tizi Ouzou, 10 October 1982, leg. J. Gaisler. – **Bulgaria**: 2 m (NMP 50163, 50164 [S+A]), Gela, small cave, 12 and 13 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 6 m, 1 f (NMP 50165–50171 [S+A]), Gela, Ladenica Cave, 13 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 2 m, 3 f (NMP 50174, 50176–50178, [S+B], 50180, 50181 [S]), Gorna Breznica, 16 July 1981, 15 July 1982, 9 and 11 July 1983, leg. J. Flousek, D. Frynta, R. Fuchs, D. Holečková, I. Horáček, H. Prágerová, K. Hůrka & V. Vohralík; – 1 f (NMP 50172 [S+A]), Jagodina, Dolna Karanska dupka Cave, 16 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 1 m (NMP 50182 [S+A]), Jagodina, Gorna Karanska dupka Cave, 3 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 1 f (NMP 50162 [S+A]), Karlukovo, 8 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 1 m (NMP 50161 [S+A]), Karlukovo, touristic hut, 12 June 1977, leg. V. Bejček, J. Škopek, P. Vašák & V. Vohralík; – 1 m (NMP 50173 [S+B]), Orehovo, cave, 24 August 1980, leg. D. Holečková, J. Jirouš, H. Prágerová & V. Vohralík; – 3 f (NMP 50179 [S+A], 50066, 50067 [S+B]), Ploski, 16 July 1982, 14 August 1987, leg. D. Frynta, D. Holečková, I. Horáček, P. Musil, H. Prágerová & V. Vohralík; – 1 m (NMP 50159 [S+B]), Spahievo, 14 July 1986, leg. V. Hanzal, K. Hůrka, P. Musil, M. Průcha, M. Šálek, V. Vohralík & K. Weidinger. – **Croatia**: 1 m (NMP YU8/77 [S+A]), Zavala, Belušica peć Cave, 29 August 1977, leg. J. Červený. – **Cyprus**: 1 f (NMP 90418 [S+A]), 5 km S of Lefke, 15 April 2005, leg. P. Benda & V. Hanák; – 2 f (NMP 90429, 90430 [S+A]), Inçirli Cave, ca. 4 km SE of Çınarlı, 6 April 2005, leg. P. Benda, V. Hanák & I. Horáček. – **Czech Republic**: 1 f (CUP unnumbered [S]), Beroun; – 1 f (NMP 818/59 [S+B]), Býchory u Kolína, forestry attic, 19 July 1959, leg. V. Hanák; – 1 m (WBM 16052 [S+B]), Hostouň, 3 June 1971, leg. L. Hůrka; – 1 m, 1 f (NMP 14/58, 34/76 [S+B]), Chýnov, Chýnovská Cave, 15 January 1958, 30 November 1976, leg. V. Hanák; – 12 f (SMO 2795, 2796, 2806, 3128, 3132–3135, 3961, 4081, 4578, 4586 [S+B]), Hlavnice nr. Opava, 10 and 14 August, 7 September 1968, 23 and 26 May 1969, 5 August 1972, 19 May 1973, 26 April and 22 May 1976, leg. K. Kořistka; – 2 m (NMP MN6, MN7 [S]), Jílové, mine, 9 February 1975, leg. I. Horáček; – 2 m, 1 f (WBM 15005, 15826, 15930 [S+B]), Kašperské Hory, 14 February 1969, 13 January and 23 February 1971, leg. L. Hůrka; – 4 m, 1 ind. (NMP 815/58, 819/58, 820/58, 341/64, 374/64 [S+B]), Klec, Potěšil Fishpond, 16 September 1958, 22 August 1964, leg. V. Hanák; – 1 f (NMP 50/75 [S+B]), Kobyla, mine, 14 April 1975, leg. V. Hanák; – 1 m (NMP 12/75 [S+B]), Kozolupy u Berouna, mine, 11 February 1975, leg. V. Hanák; – 2 m, 5 f, 4 inds. (NMP Ti4, Ti9, Ti22–Ti25, unnumbered [S+B]), Lomnice nad Lužnicí, church attic, 8 August 1955, leg.

V. Hanák; – 4 f (WBM 15060, 15061, 15063, 16364 [S+B]), Oselce, 2 June 1969, leg. L. Hůrka; – 1 m, 1 f (NMP D10, D12 [S+B]), Ovesné Kladruby u Mariánských Lázní, 15 August 1956, leg. V. Hanák; – 4 inds. (SMO 2228–2230, 2235 [S+B]), Silesia (undef.); – 3 f, 1 ind. (NMP 764/59, 765/59, 769/59, 153/65 [S+B]), Smržov, Dvořiště Fishpond, house attic, 5 July 1959, 1 May 1965, leg. V. Hanák; – 2 m (NMP MN4, MN5 [S+B]), Srbsko, mine, 3 and 24 November 1974, leg. I. Horáček; – 1 f (WBM 16241 [S+B]), Starý Rybník, 22 February 1972, leg. L. Hůrka; – 1 m (NMP 2/62 [S+B]), Trněný Újezd, mine, 19 January 1962, leg. V. Hanák; – 1 m (NMP MN3 [S+B]), Týnčany, cave, 26 October 1974, leg. I. Horáček; – 1 ind. (NMP BB [S+B]), Velký Bor u Horažďovic, 5 June 1956, leg. V. Hanák; – 1 f (NMP E184 [S+B]), Velký Tisý, dam, 17 July 1957, leg. V. Hanák; – 3 m (CUP unnumbered [S]), Central Bohemia (undef.), 20 October 1974, leg. I. Horáček. – **Germany**: 1 m (SMO 4599 [S+B]), Serrahn, Neusterlitz Distr., 9 September 1975, leg. V. Borůvka. – **Greece**: 15 f (WIC 64/1–64/15 [S]), Akrati, 9 August 1964, leg. W. Issel; – 2 m, 5 f (NMP 49024, 49027 [S+A], 49025, 49026 [A], WIC 71/1–71/3 [S]), Mistras, ruins, 20 August 1971, 27 August 2001, leg. P. Benda & W. Issel; – 1 m (NMP 48560 [S+B]), Olympos Mts, Prionia, 1100 m, 17 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m (NMP 48581 [S+B]), Pappigo, Tymphi Mts, cave, 26 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 2 m (NMP 49019, 49020 [S+A]), Viziki, tunnel, 25 August 2001, leg. P. Benda. – **Israel**: 1 f (BMNH 67.1228 [S+B]), Aqua Bella nr. Jerusalem, 30 April 1961, leg. D. Harrison (holotype of *Myotis nattereri hoveli* Harrison, 1964); – 2 f (TAU 6106, 6107 [S+B]), Dor, glass factory, 24 April 1976; – 1 f (SMF 20458 [S]), Judean Mts, 12 February 1961, leg. Z. Lev; – 1 f (SMF 19592 [S]), Mt. Carmel, 27 June 1961, leg. Z. Lev; – 3 f (TAU 6111, 6112, 6828 [S+B]), Sheik Abrak, 25 April 1976. – **Slovakia**: 2 m (SNM 414, unnumbered [S]), Buková, 17 April 1954, 14 February 1960, leg. B. Matoušek; – 1 m (WBM 13700 [S+B]), Silica, Silická Ladnica Cave, 18 March 1968, leg. L. Hůrka. – **Turkey**: 1 m (WIC 75/1 [S]), Alanya, 1975, leg. W. Issel; – 1 m, 9 f (SMF 36755, 36756, 36758–36762, 36769–36771 [S+B]), Incekum nr. Alanya, 21 May 1966, leg. H. Felten et al.; – 1 f (NMP 47924 [S+A]), Narlikuyu, Cennet Cave, 4 August 1992, leg. P. Benda; – 1 m (CUP T93/32 [S+A]), Sarpdere, Dupnisa Mağara Cave, 16 October 1993, leg. P. Benda & I. Horáček; – 7 f (NMW 11818–11824 [S+B]), Seddülbahir, 31 May 1967, leg. F. Spitzenberger; – 1 f (NMP 47916 [S+A]), Silifke, castle, 1 August 1992, leg. P. Benda; – 2 m (CUP T93/76, T93/77 [S+A]), Yalan Dünya Cave, 30 October 1993, leg. P. Benda & I. Horáček.

Myotis schaubi Kormos, 1934

Armenia: 3 inds. (ZIE N665, N668, NMP SA76 [S+B]), Amagi, Vajkskij Range, 22 June 1946, leg. S. Dal' (including the holotype of *Myotis nattereri araxenus* Dal', 1947). – **Iran**: 2 inds. (BMNH 63.1194, 63.1195 [S+A]), Guter-Su, N. of Mount Sabalan, 38° 10' N, 47° 40' E, 21 August 1961, leg. Aberystwyth University Expedition; – 1 m (NMP 48130 [S+A]), 7 km SE of Choplu, cave, 2 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin; – 2 m, 1 f (NMP 48145–48147 [S+A]), Takht-e Suleyman, castle ruins, 3 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin.

Myotis tschuliensis Kusjakin, 1935

Armenia: 1 m (ZIE N140 [S+B]), Elenovka, Lake Sevan, 19 August 1927, leg. Šelkovnikov. – **Azerbaijan**: 1 f (NMP 91690 [S+B]), Taglar, Gadrud District, 26 September 1967, leg. I. Rahmatulina; – 1 m, 1 f (NMP 91688, 91689 [S+B]), Tug, Gadrud District, 28 and 30 August 1968, leg. I. Rahmatulina; – 2 f (NMP 91304, 91311 [S+B]), Şemaxa, Mt. Kys-Kalasy, 26 and 28 June 1979, leg. I. Rehák. – **Iraq**: 1 f (ISEA 5148 [S+B]), Gali Ali Beg, leg. A. Nadachowski & B. Rzebik-Kowalska. – **Russia**: 1 m (ZMMU 29219 [S+B]), Hasan-Jurt, Dagestan, 13 July 1928, leg. Kresovskij. – **Turkey**: 1 m (NMP 90568 [S+A]), 5 km W of Sarikamiş, 11 September 1995, leg. P. Benda & I. Horáček. – **Turkmenistan**: 3 f, 2 inds. (ZMMU 2318, 5198, 29216, 46928, S61788 [S+B]), Čuli, Kopetdag Mts, 6 and 8 July 1925, leg. S. Ognev (including the holotype of *Myotis nattereri tschuliensis* Kusjakin, 1935).

Myotis emarginatus (Geoffroy, 1806)

Afghanistan: 2 f (SMF 38916, 38917 [S+A]), Kabul, 18 July 1962, 8 May 1963, leg. D. Meyer-Oehme. – **Algeria**: 1 f (MUB A050, 243, 244, 246, VMO 4717 [S+B]), Bejaïa, Aokas, cave, 21 May 1981, 14 May 1982, leg. J. Gaisler; – 1 f (ISEA 9617 [S+B]), Madagh, 10 April 1982, leg. K. Kowalski & B. Rzebik-Kowalska; – 3 m, 1 f (ISEA 9606, 9614–9616, 9618 [S+B]), Sig, 21 December 1978, 2 and 30 July 1979, 29 October 1979, 4 December 1982, leg. K. Kowalski & B. Rzebik-Kowalska. – **Austria**: 1 m (NMW 51071 [S+B]), Bad Fischau-Brunn, Niederösterreich, 23 January 1993; – 1 m (NMW 29424 [S+B]), Drachenhöhle, Steiermark, 4 January 1976; – 1 f (NMW 30430 [S+B]), Eggenburg, Niederösterreich, 19 March 1979; – 1 f (NMW 29988 [S+A]), Göttlesbrunn, Niederösterreich, 1905; – 1 f (NMW 15709 [S+B]), Graz-Umgeb. bei Peggau, Steiermark, 20 January 1973; – 1 f (NMW 51073 [S]), Hohenau/Raab, Steiermark, 14 March 1993; – 5 m, 2 f (NMW 19982, 51072, 51152, 51426, 52209 [S+B], 36582, 51427 [S]), Kirchberg am Wechsel, Hermannshöhle, Niederösterreich, 26 May 1965, 6 August 1975, 16 March 1985, 15 March 1986, 21 May 1993, 27 July 1994, 12 August 1994; – 1 m (NMW 12030 [S+B]), Kleinzell, Lilienfeld, Niederösterreich, 4 December 1966; – 1 m (NMW 30431 [S+B]), Laab/Walde, Niederösterreich, 23 June 1979; – 2 f (NMW 52322, 53498 [S]), Laussa, Oberösterreich, 27 July 1991, 3 August 1996; – 1 f (NMW B4794 [S]), Laxenburg, Niederösterreich, 20 August 1930; – 1 m (NMW

52323 [S]), Naas, Steiermark, 7 January 1996; – 1 f (NMW 53496 [S]), Poettsching, Burgenland, 14 July 1988; – 1 m (NMW 29425 [S+B]), Pyhra, Niederösterreich, 25 June 1977; – 1 f (NMW 30432 [S+B]), Thernberg, Ausserschildgraben, Niederösterreich, 16 May 1981; – 4 f (NMW 9117–9119 [S+B], 9158 [S]), Wien 25, Kaltenlentgeben, 19 June 1955, 27 May 1963. – **Azerbaijan**: 2 f (ZIN 77341, 77342 [S+B]), Lenkoran' Region, tea factory n. 1, 10 July 1984, leg. I. Rahmatulina. – **Bulgaria**: 9 f (NMP 50360–50368 [S+A]), Arkutino, 13 May 1983, leg. D. Scholz & D. Král; – 1 m (NMP 38562 [S+B]), Gela, 31 July 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 5 inds. (NMP 50326–50330 [S+A]), Goljam Kamăk, 13 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 7 m (NMP 38560, 38561, 38563, 47/72C, F, G, I [S+B]), Jagodina, 2 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 3 m (NMP 50317–50319 [S+A]), Jagodina, Imamova dupka Cave, 15 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 3 m (NMP 50314–50316 [S+A]), Jagodina, Sančova dupka Cave, 15 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 1 m, 4 f (NMP 50207, 50231–50233, 50303 [S+A]), Karlukovo, 3 July 1976, 14 June 1977, 9 August 1978, leg. V. Bejček, M. Braniš, P. Donát, J. Flegr, V. Hanák, I. Horáček, K. Hůrka, J. Janda, J. Jirouš, J. Škopek, V. Švihla, P. Vašák & V. Vohralík; – 2 f (NMP 50222, 50223 [S+A]), Karlukovo, touristic hut, 12 June 1977, leg. V. Bejček, J. Škopek, P. Vašák & V. Vohralík; – 1 f (NMP 50325 [S+A]), Komunari, 12 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 6 m (NMP 50339–50344 [S+A]), Orehovo, 30 August 1980, leg. D. Holečková, J. Jirouš, H. Prágerová & V. Vohralík; – 2 f (NMP 50205 [S+A], IVB 11 [S+B]), Peštera, Snežjanka Cave, 19 September 1962, leg. J. Gaisler; – 1 f (IVB 38 [S+B]), Peštera, Ušatovi dupki Cave, 8 August 1967, leg. J. Gaisler; – 1 f (NMP 47/72/C96 [S+B]), Primorsko, 17 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 33 f (NMP 49147, 49149, 49153–49161, 49163, 49164 [S+B], 50183–50190, 50192–50197, 50278, 50281, 50283, 50285–50287 [S+A]), Sliven, Zmejovi dupki Cave, 25 May 1957, 15 July 1975, leg. V. Hanák & J. Červený; – 2 m (NMP 50150, 50151 [S+B]), Velingrad, Lepenica Cave, 9 July 1981, leg. J. Flousek, R. Fuchs & V. Vohralík. – **Croatia**: 1 m, 1 f (ZZZ 3056, 3057 [S+B]), Korčula Island, Postrana, 29 July 1969, leg. B. Đulić; – 2 f (ZZZ 3052, 3053 [S+B]), Korčula Island, Pupnat, 28 July 1969, leg. B. Đulić; – 1 f (ZZZ 3076 [S+B]), Vis Island, 30 July 1969, leg. B. Đulić; – 2 m, 2 f (ZZZ 307, 344, 349, 350 [S]), Zagreb, Veternica; – 1 f, 3 inds. (ZZZ 352, 3102, 10568, 10571 [S]), Croatia (undef.). – **Cyprus**: 6 m, 3 f (NMP 90400, 90401, 90931–90935, 91264 [S+A], 90936 [A]), Troodos Forest, 4.5 km SW of Kakopetria, mine, 29 March 2005, 11 April 2005 13 October 2005, 27 July 2006, leg. P. Benda, I. Horáček, P. Hulva & R. Lučan. – **France**: 1 f (ZFMK 97.110 [S+B]), Aignes-Mortes, Gard d'France, 27 June 1958, leg. C. König; – 3 f (SMF 19171–19173 [S+B]), Bouches-du-Rhone, Les Baux, Grotte des Fées, 20 June 1958, leg. C. König; – 2 m (MNHN 1997-317, 318 [S]), Buré d'Orval, Muerthe-et-Moselle, April 1931, leg. H. Heim de Balsac; – 1 m, 3 f (MNHN 1963-865, 866, 1984-89, 90 [S+A]), Cachan, Val-de-Marne, 31 March 1946, 26 January 1947, 31 March 1948, leg. J. Balazuc & de Bauffremont; – 1 f (SMF 19365 [S+B]), Corsica, Cap Corse, Brando, 27 September 1953, leg. H. Kahmann; – 1 f (SMF 50429 [S+B]), Corsica, Rapole, 28 August 1976, leg. H. E. Back; – 1 f (SMF 19366 [S+B]), Corsica, Sorio, 3 July 1956, leg. H. Kahmann; – 2 f (MNHN 1998-955, 956 [S+B]), Les Riceys Aube, Grotte de Frolle, 13 March 1981, leg. J. Cuisin; – 1 m (MNHN 1963-868 [S+B]), Mériel, Setoise, 9 February 1947, leg. J. Balazuc; – 1 m, 2 f (MNHN 1984-116–118 [S+A]), Mortagne, Orne; – 1 f (MHNG 1255.06b [S+A]), Tourtenay, Deux-Sèvres, 23 December 1951, leg. F. Chanudet; – 1 f (MNHN 1963-867 [S+A]), Varrèdes, Seine-et-Marne, 13 February 1944, leg. J. Balazuc. – **Georgia**: 2 f (ZMMU S84000, S84001 [S+B]), Georgia (undef.), 29 and 31 August 1939, leg. A. P. Kuzjakin. – **Greece**: 2 m (NMW 45454, 45455 [S+B]), ESE of Delphi, Corycian Grotta, 7 August 1979; – 29 f (NMW 31359 [S], 31360–31369, 31371–31373, 31376, 31378, 31379, 31382 [S+A], 31370, 31374, 31375, 31377, 31380, 31381, 31383–31386 [S+B]), Petralona, Fledermaushöhle, 3 June 1977; – 8 f (NMW 45753–45760 [S+A]), Stavros nr. Rendina, bunker galleries, 12 July 1979, leg. U. Passauer; – 1 f (NMP 48630 [S+B]), 8 km E of Xanthi, 17 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík. – **Iran**: 1 f (NMP 90884 [S+A]), 10 km W of Pul, 1 June 2006, leg. P. Benda & A. Reiter; – 1 m (BMNH 77.828 [S+B]), Azad-Khan Cave, Mahallet, leg. E. Etemad; – 1 f (NMP 90765 [S+A]), Imam Zadeh Mousa, 12 May 2006, leg. P. Benda & A. Reiter; – 1 f (NMP 48465 [S+A]), Isin, 15 km N of Bandar Abbas, 30 April 1977, leg. B. Pražan; – 3 inds. (BMNH 9.1.4.33., 74.11.21.30. [S+A], 74.11.21.29. [S]), Jalk, Baluchestan, leg. Royal Army Medical College & W. J. Blanford (cotypes of *Vespertilio desertorum* Dobson, 1875); – 1 f (NMP 48448 [S+A]), Khoshangan, 19 April 2000, leg. P. Benda & A. Reiter; – 1 m (NMP 90856 [S+A]), Korud Abad, 2 km SE of Ali Abad, 28 June 2006, leg. P. Benda & A. Reiter. – **Israel**: 1 f (TAU M6570 [S+B]), Hazorea, 14 April 1975; – 1 m (TAU M6373 [S+B]), Maagan Mikhael, 10 June 1974; – 1 f, 1 ind. (NMW 33850 [S+B], TAU M2858 [S]), Nahal Oren, 6 May 1962; – 5 f, 2 inds. (TAU M2474–2476, 2481, 6547, 6864, 6865 [S+B]), Nahal Oren, Etsba cave, 24 April 1960, 14 April 1975, 5 April 1976. – **Italy**: 1 m (SMF 10836 [S+A]), Sardinia, Sassari, Grotta del Inferno, 22 March 1951, leg. H. Felten, Frich & Müller; – 8 f (SMF 17165–17167, 17173–17177 [S+A]), Sicily, Catania, Lingulaglossa, Grotta Corrucio, 10 July 1955, leg. K. Klemmer & H. E. Krampitz. – **Kazakhstan**: 1 f, 1 ind. (ZMMU S94708, S94709 [S+B]), between Majkat and Amandar, 20 July 1959, leg. O. Bogdanov; – 12 f (ZIN 62160–62171 [S+A]), E slope of the Karatau Mts, Čimkent Prov., Suzakskij Dist., Altyntau, 2 July 1975, leg. P. Strelkov; – 1 f (ZMMU S83999 [S+B]), Kazakhstan (undef.), 10 June 1944, leg. O. Bogdanov. – **Kirghizstan**: 1 f (SMF 77779 [S+A]), Sasik Ungur, 1000 m, cave, 30 May 1990, leg. J. Červený. – **Morocco**: 1 f (MHNG 1492.87 [S]), 145 km ENE of Marrakech, Grotte du Caïd, Aïd Mehommed, 5 June 1978, leg. P. Strinati; – 1 f (MNHN 1985-1564 [S+A]), Berkane, Grotte de Tazarine, 1955, leg. A. Brosset; – 2 f (ZFMK 61.217, 61.218 [S+B]), Taforalt Region, 30 April 1961, leg. H.

Roer. – **Portugal**: 1 f (SMF 18066 [S+A]), Coimbra, Bordalao, 13 July 1928, leg. M. M. da Gama. – **Russia**: 1 m (ZMMU S21535 [S+B]), Kavkazskij Reserve, Majkop District, 27 August 1932. – **Serbia**: 8 f, 1 ind. (NMW 9367, ZIN 35058–35061, 35422, 48086, ZMMU S43760, S43761 [S+B]), Beograd, Tapčidar, 31 May 1936, 11, 15 and 24 May 1942, 6 June 1946, 15 August 1949, leg. V. Martino, E. Martino, Ž. Adamovič & A. Petrova. – **Spain**: 1 m (EBD 15538 [S+B]), Casa Dos Guejigales, Ronda, Málaga, Sra. de las Wieres, 19 June 1987; – 1 m, 1 f (EBD 9925, 9926 [S+B]), Monte Carbonal, Huetar Santillán, Cueva del-Negro, 21 August 1963; – 1 m (EBD 9927 [S+B]), Palacio de Doñana, Huelva, 27 July 1966; – 5 f (EBD 9606, 9684, 9686, 9701, 9707 [S]), Pantano, Bermejales, 4 June 26 July 1983; – 1 m (EBD 15428 [S+B]), Perezoso de Camilla, 4 km N of Lisero de la Hana del Ravel, 4 July 1987; – 1 m (SMF 21481 [S+B]), Salamanca, Linares de Riofrio, 30 August 1962, leg. H. Grün. – **Switzerland**: 1 m (MHNG 967.95 [S]), Grotte du Moron, Doubs, 16 November 1946, leg. V. Aelen. – **Turkey**: 9 f (NMP 47932, 47935–47939, 47941–47943 [S+A]), Çevlik, 20.5.1995, leg. P. Benda, J. Flegr & J. Sádlová; – 8 f (NMW 13419, 13423, 13426–13431 [S+A]), S of Kiyiköy (= Midye), cave, Kirklareli Prov., 2 and 3 June 1968, leg. F. Spitzenberger; – 1 m (NMW 34373 [S+B]), Olimpos NP, Antalya Prov., 31 July 1984, leg. F. Spitzenberger; – 1 m (NMP 47959 [S+B]), Safe suyu Cave, 1 September 1996, leg. M. Andreas, P. Benda & M. Uhrin; – 1 m (CUP T93/33 [S+A]), Sarpdere, Dupnisa Mağara Cave, 16 October 1993, P. Benda & I. Horáček; – 1 f (NMW 11815 [S+B]), 4 km S of Yalova, castle ruins, Canakkale Prov., 31 May 1967, leg. F. Spitzenberger. – **Turkmenistan**: 1 ind. (ZMMU S29213 [S+B]), Ašhabadskij Region, nr. the village of V. Skobemvskogo, 6 June 1925, leg. S. Ognev; – 3 f (ZIN 54176, 56666, 59541 [S+B]), Bahardenskaja Cave, 12 May 1965, 12 May 1967, 12 June 1970, leg. H. Babaev & P. Strelkov; – 1 f (ZIN 54195 [S+B]), Čaršangin Dist., Svincovyj Rudnik, caves, 31 May 1967, leg. P. Strelkov; – 1 m (ZMMU S104386 [S+A]), Murgab Valley, Turkmen Kala, 11 June 1917, leg. S. T. Bil'kevič (holotype of *Myotis emarginatus turcomanicus* Bobrinskoy, 1925); – 1 f (ZIN 57944 [S+B]), Kučitan'-Tau Mts, Svincovyj Rudnik, cave, 18 May 1971, leg. P. Strelkov. – **Ukraine**: 5 f (ZIN 43963–43967 [S+A]), Krym, Kara-Dag, Barahta Bay, 1 August 1960, leg. N. Filipova & A. Popov; – 2 f (ZIN 29329, 29330, ZMMU S28574 [S+B]), Krym, Karasudaši, 25 June 1938, leg. Popov; – 1 f (ZIN 54335 [S+B]), Krym, nr. Simferopol', June 1967, leg. P. Strelkov & A. Konstatinov; – 1 f (ZIN 44054 [S+B]), Krym, Sudakskij District, Kara-Dag, 6 June 1960, leg. Dmitrieva. – **Uzbekistan**: 3 m, 2 f (ZMMU S94707, ZIN 57299, 62511–62513 [S+B]), Kara-Kamyš River, 15 May and 27 June 1946, 22 July 1953, leg. A. Andruško & O. Bogdanov; – 6 f, 1 ind. (ZMMU S6818, S29234–29236, S94117, S94710, ZIN 59441 [S+B]), Tashkent, 15 June 1932, 7 July 1947, 8 May 1949, leg. R. Meklenburzev, O. Bogdanov & S. Ognev (including the holotype of *Myotis lanaceus saturatus* Kuzjakin, 1934).

Myotis aurascens Kusjakin, 1935

Azerbaijan: 1 f (ZIN 9019 [S+A]), Elizavetpol'skaja gubernija [= Găncă Reg.], 1895, leg. K. Satunin; – 1 m (NMP 48519 [S+B]), Geokçay Valley, 1460 m a. s. l., 29 August 1975, leg. V. Bejček; – 1 f, 1 ind. (ZIN 23507, 76-1916 [S+A]), Geok-Tapa, Areš District, Elizavetpol' Region [= Port Iliç], 30 July 1915, leg. L. Bianki; – 1 m (ZMMU S84003 [S+A]), Azerbaijan (undef.), 12 July 1938, leg. Apuljan. – **Bulgaria**: 1 m (NMNHS N92 [S+A]), Beli Iskar Dam, Rila Mts, 1900 m, 16 July 1994, leg. V. Beškov; – 1 m (NMP 38778 [S+B]), Čepelare, 1240 m a. s. l., 7 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 1 f (NMP 48478 [S+B]), Gara Tulovo nr. Kazanlak, 24 May 1957, leg. V. Hanák; – 7 m, 13 f (NMP 48342 [S+A], 48488, 48489, 48493, 48494, 48497–48500, 48502, 48503, 48506, 48508, 48509 [S+B], 48491, 48492, 48495, 48496, 48510, 48511 [S]), Gorna Breznica, 15–22 July 1981, 14 and 19 July 1982, 9 and 13 July 1983, 25 July 1994, leg. P. Benda, J. Flousek, D. Frynta, R. Fuchs, D. Holečková, I. Horáček, K. Hůrka, H. Pragerová & V. Vohralík; – 1 m (NMNHS N138 [S+A]), Hristo Danovo, Mazata Cave, 3 November 1997, leg. P. Beron & V. Beškov; – 1 m (NMP 48481 [S+B]), Karlukovo, 8 August 1978, leg. P. Donát, J. Flegr, J. Janda, F. Pojer & V. Vohralík; – 2 f (NMP 48479, 48480 [S]), Momčilgrad, 17 June 1977, May 1978, leg. V. Bejček, P. Donát, F. Pojer, J. Škopek, P. Vašák & V. Vohralík; – 1 m, 1 f (NHNMS N94, 95 [S+A]), Pasarel, Iskar river, 18 August 1994, leg. V. Beškov, T. Ivanova & R. Pandurska; – 3 m, 1 f (MTD B13208, ZMB 47264–47266 [S+B]), Philippopel [= Plovdiv], 3, 9 and 21 September 1935, leg. G. Heinrich (including the holotype of *Myotis mystacinus bulgaricus* Heinrich, 1936); – 1 m (NMNHS N117 [S+A]), Pleven hut, Vodnite dupki Cave, 15 August 1997, leg. T. Ivanova; – 1 m (NMNHS N139 [S]), Bulgaria (undef.), 25 August 1907. – **Croatia**: 6 f (NMW 29815, 29816, 29819–29821, 29823 [S+B]), Dalmatia (undef.), before 1884, leg. Kolobatović; – 2 f (SMO 5696, 5697 [S+B]), Dubrovnik, Soline, 1 July 1984, leg. (?) B. Beneš; – 1 m (ZZZ 2268 [S+B]), Brač Island, Lažišće, 25 July 1968, leg. B. Đulić; – 1 f (ZZZ 3012 [S+B]), Korčula Island, Čara, 23 July 1969, leg. B. Đulić; – 1 m (ZZZ 2151 [S+B]), Šolta Island, Grohote, 13 August 1967, leg. B. Đulić; – 3 f (NMW 29810–29812 [S+B]), Scoglio Fernić nr. Filipjakov, 5 June 1891; – 1 f (ZZZ 10565 [S+B]), Šibenik, Čikule Canyon, 23 June 1989, leg. B. Đulić. – **Georgia**: 1 m (ZIN 9287 [S+A]), Lagodehi, 25 July 1911, leg. Mlokosevič. – **Greece**: 1 m (NMP 48345 [S+A]), Crete, Stavros, 10 July 1995, leg. I. Horáček; – 1 m (NMP 48517 [S]), Metamorfósi, 16 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 3 f (NMP 48512, 48513, 48515 [S+B]), Ormília, 14 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 f (NMP 48516 [S+B]), Priónia, Olympos Mts, 17 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 f (NMP 48346 [S+A]), Spárti, 17 September 1996, leg. P. Benda & M. Uhrin; – 1 f (NMP 51477 [S+A]), Stoupa nr. Kardamíli, 7 July 1991, leg. M. Anděra & P. Zbytovský; – 1 ind. (ZFMK 77.37 [S]), Halkidíki Peninsula, 28 May 1962, leg. H. Wolf. – **Iran**: 3 m (BMNH 63.1196–1198 [S]), Gutur Su, N of Mt. Sabalan, 21 August 1961, leg. University of

Wales Expedition. – **Italy**: 1 f (MZSF 5200 [S+A]), Equi, Alpi Apuane, Lucca, Toscana, summer 1876; – 1 f (MZSF 5950 [S+A]), Can. Miradolo, Pinerolo, Piemonte, May 1873; – 1 f (SMF 34265 [S+B]), Mt. Altissimo di Nago (Mte. Baldo), May 1964, leg. G. Storch & F. Malec. – **Macedonia**: 1 ind. (ZIN 62630 [S+B]), Kočane [= Kočani], 29 September 1931, leg. V. Martino. – **Moldavia**: 2 f (ZIN 55692, 55693 [S+B]), Bygok, Tiraspol' Region, 24 and 26 February 1969, leg. P. Strelkov; – 1 m, 1 f, 1 ind. (ZIN 62424, 62426, 62691 [S+A]), Meleşti nr. Chişinau, 22, 23 and 27 January 1976, leg. E. Buntova; – 2 m, 1 f (ZIN 55594–55596 [S+A]), Moldavia, February 1969, leg. P. Strelkov. – **Montenegro**: 1 m (NMP 90208 [S+A]), Vitoglav, 2 km SW of Risan, 31 July 2002, leg. P. Benda; – 1 m (NMP 90226 [S+A]), Stabna, Vrbnica river, 8 August 2002, leg. P. Benda. – **Russia**: 3 f (ZIN 80848, 80850, 80877 [S+B]), road between Levokumskoe and Aleksandrovskoe, Stavropol' Region, 15 June 1994, leg. V. Il'in & P. Strelkov; – 2 m (ZIN 4909, 4910 [S+A]), Dagestan, Mius District, leg. Kirillov; – 1 f (ZIN 69879 [S+B]), railway quarters, near Ipatovo, Stavropol' Region, 4 July 1983, leg. P. Strelkov; – 1 f (ZMMU S166219 [S+A]), vicinity of Krinipovskoe, Tuapse District, 10 August 1998, leg. S. Kruskop & S. Apisimova; – 1 m, 2 f (ZMMU S9266, S46560, S46562 [S+B]), Kurkužin nr. Vladikavkaz, 11 May 1928, leg. A. Radyščev (including the holotype of *Myotis mystacinus aurascens* Kusjakin, 1935); – 1 f (ZIN 78274 [S+B]), Malyj Irtyš field station, Novorossijsk District, 17 August 1990, leg. M. Masing; – 2 m (ZMMU S46561, S46564 [S]), Northern Caucasus, 31 May 1925, 2 May 1928, leg. A. Radyščev; – 1 ind. (ZMMU S5022 [S+B]), Tarasovskij District, 14 September 1926; – 1 m (ZMMU S29432 [S+B]), Tarasovka station, 17 August 1925, leg. V. Raevskij; – 1 f (ZIN 78288 [S+B]), Terek river alluvium, Kargaminskaja, between Groznyj and Kizljar, 6 June 1990, leg. P. Strelkov. – **Serbia**: 2 ind. (ZIN 35062, 35064 [S+B]), Peć, 17 and 31 August 1939, leg. V. Martino. – **Turkey**: 1 m (OHC unnumbered [S+B]), a valley NW of Ispir, 4 August 1983, leg. O. von Helversen; – 1 f (OHC unnumbered [S+B]), a canyon over Beşkonak, 10 October 1984, leg. O. von Helversen; – 1 m, 1 f (ZDNU 1998/101, 103 [S+B]), Beyşehir, 9–10 August 1998, leg. A. Karataş; – 1 f (ZDNU 2002/111 [S+B]), Kızılcahamam, Kirmir river, 8 August 2002, leg. A. Karataş; – 1 f (OHC unnumbered [S+B]), Taurus Mts nr. Üçpınar, ca. 20 km E of Bozkir, 27 June 1986, leg. O. von Helversen; – 1 m (NMP 48094 [S+A]), a railway bridge ca. 5 km N of Sirbasan, 10 September 1995, leg. P. Benda & I. Horáček; – 1 m (OHC unnumbered [S]), Şohun Dere, 8 August 1983, leg. O. von Helversen; – 3 m (NMP 47912–48914 [S+A]), Van Castle, 28 July 1992, leg. P. Benda. – **Ukraine**: 1 m (ZIN 49555 [S+A]), Bolgrad, Melitopol' Region, 5 August 1913, leg. Aleksandrov; – 2 m, 3 f (ZIN 53032–52036 [S+A]), Folinska Balka, Beljaevka District, Odessa Region, 14 January and 7 February 1964, leg. Voljanskij; – 1 ind. (ZIN 49554 [S+A]), Kullar-Kupčak, Perekopskij Region, Crimea, 26 June 1916, leg. Raškovskij; – 1 f (ZMMU S4159 [S+B]), Don Army Region [= cf. Doneck Region], leg. B. Obrazcov; – 1 ind. (ZMMU S29157 [S+A]), Doneck Region, 31 August 1926, leg. Karabukov; – 1 m (ZIN 45249 [S+B]), vicinity of Kamenskoe, Kerč Peninsula, Crimea, February 1961, leg. A. Konstantinov (holotype of *Myotis mystacinus popovi* Strelkov, 1983); – 2 m (ZIN 68508, 67509 [S+A]), Karadag, Crimea, 6 July 1960, leg. A. Konstantinov & P. Strelkov; – 1 m, 2 f (ZIN 78275–78277 [S+B]), Kujuk-Tuk Island, Sivaš Bay, Herson Region, 12 and 13 August 1990, leg. M. Masing; – 3 m (ZIN 9249–9251 [S+A]), vicinity of Simferopol', 1889, leg. Kessler; – 2 inds. (ZIN 8057, 9189 [S+A]), Tatajkoj, Crimea, 1890, 1895?, leg. Kessler; – 3 f (ZMMU S84006–84008 [S+B]), Zaporižžija, 9, 14 and 19 July 1939, leg. B. Popov.

Myotis nipalensis (Dobson, 1871)

Azerbaijan: 1 f (ZIN 9018 [S+A]), Elizavetpol' [= Găncă] Region, 1895, leg. K. Satunin; – 2 f (ZIN 8182, 23505 [S+A]), Geok-Tapa, Areš District, Elizavetpol' Region [= Port Iliç], 1906, 1915, leg. Šelkovnikov; – 1 f (NMP 49237 [S]), Mingaçevir, 27 June 1986, leg. P. Škoudlín; – 1 ind. (ZIN 5346 [S+A]), Kura river, Salyan, 1888, leg. Varnahovskij; – 1 f (NMP 48521 [S+B]), Şaki District, 29 April 1976, leg. I. Rahmatulina. – **Iran**: 2 m (NMP 48119, 48120 [S+A]), Bastam, 30 September 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin. – **Kazakhstan**: 4 f (ZIN 65107, 65109–65111 [S+B]), left bank of the Emba river, 125 km ENE of the town of Kul'sary, 10 May 1977, leg. P. Strelkov; – 1 ind. (ZIN 9461 [S+A]), Fort-Ševčenko, 28 May and 10 June 1904; – 1 ind. (ZIN 5117 [S]), Mangyšlak, leg. K. Ber; – 1 f (ZIN 69040 [S+B]), Karakol' Lake, Turgaj river estuary, 10 June 1974, leg. V. Orlov. – **Turkey**: 1 m, 1 f, 2 inds. (ZIN 9002, 9003, 9009, 9011 [S+A]), Aralik, 6 September 1900, 1901, leg. K. Satunin; – 1 m (NMP 48095 [S+A]), a railway bridge ca. 5 km N of Sirbasan, 10 September 1995, leg. P. Benda & I. Horáček; – 1 f (ZDNU 2003/38 [S+B]), Sarıkamış, 2 km S of Sirbasan, 21 July 2003, leg. A. Karataş & F. Toprak; – 1 m (ZDNU 2000/15 [S+B]), Selim, Sarıgün, 15 September 2000, leg. A. Karataş. – **Turkmenistan**: 10 f (NMP 48539, ZIN 56674–56682 [S+B]), Gasan-Kuli, 16 July 1964, 29 and 30 May 1970, leg. V. Hanák & P. Strelkov; – 2 m, 1 f (NMP 48538, 48539, ZMMU S29214 [S+B]), Germab, 12 June 1925 and 16 July 1964, leg. S. Ognev & V. Hanák (including the holotype of *Myotis mystacinus transcaspicus* Ogneff et Heptner, 1928); – 1 f (ZMMU S104470 [S]), Krasnovodsk [= Türkmenbaşi].

Myotis capaccinii (Bonaparte, 1837)

Algeria: 1 m (ISEA 9602 [S+B]), 20 km NW of Sebdou, 6 November 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 9 m, 2 f (ISEA 9603, 9605, MUB A64, A92, A173, A202, A305, A354, A380, A381, A384 [S+B]), Bejaïa, Aokas, cave, 4 June, 2 and 18 September, and 10 December 1981, 15 January, 25 September, 28 October, and 16 December 1982, 7 January and 11 August 1983, leg. J. Gaisler, K. Kokaciński, K. Kowalski & B. Rzebik-Kowalska; – 1 f (ISEA 9604 [S+B]), Tebbar, 2 May 1983, leg. K. Kowalski & B. Rzebik-Kowalska. – **Bulgaria**: 1 m, 5 f (NMP 49668–49673 [S+B]), Devenci, Hajduška peštera Cave, 7 July 1975, leg. J. Červený; – 1 m (NMP 50443 [S+A]), General Todorov, mine, 20 December 2002, leg. P. Benda & T. Ivanova; – 1 f (NMP 50175 [S+B]), Gorna Breznica, 22 July 1981, leg. J. Flousek, R. Fuchs & V. Vohralík; – 1 m, 1 f (IVB 3 [S+B], NMP 49742 [S+A]), Karlukovo, 7 February 1965, 6 August 1978, leg. P. Donát, J. Figala, J. Flegr, J. Gaisler, V. Hanák, K. Hůrka, J. Janda & V. Vohralík; – 1 f (NMP 49442 [S+A]), Karlukovo, touristic hut, 12 June 1977, leg. V. Bejček, J. Škopek, P. Vašák & V. Vohralík; – 1 m (IVB 14 [S+B]), Peštera, Ušatovi dupki Cave, 8 August 1967, leg. J. Gaisler; – 3 m, 9 f (IVB 1, NMP 49190, 49193, 49208, 49209, 49223 [S+B], 49189, 49210, 49211, 49224, 49340, 49344 [S+A]), Primorsko, Maslen Nos, cave, 5 June 1957, 27 August 1961, leg. V. Hanák, B. Král & P. Pithart; – 7 m (IVB 4–7, NMP 50098–50100 [S+B]), Zlatna Panega, Panežka izvira Cave, 8 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka. – **Greece**: 1 m, 6 f (NMP 48658–48664 [S+B]), Didimotiho, cave, 22 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (NMP 48626 [S]), Kimmeria, mine, 16 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 3 m, 1 f (NMP 48582–48584, 48616 [S+B]), Kleidonia, Voidomatis river, 27 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m (NMP 49048 [S+A]), Kria Nera, above river, 4 September 2001, leg. P. Benda; – 6 m, 4 f (NMP 48647–48656 [S+B]), 2 km SW of Maronia, above creek, 19 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík. – **Iran**: 1 f (NMP 48152 [S+A]), Bisotun, 8 October 1998, leg. M. Andreas & A. Reiter; – 2 m (NMP 48158, 48159 [S+A]), Si Mili, 12 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin. – **Turkey**: 1 m, 5 f (CUP T93/26–30, T93/45 [S+A]), Sarpdere, Dupnisa Mağara Cave, 16 October 1993, leg. P. Benda & I. Horáček; – 1 f (CUP T93/78 [S+A]), Yalan Dünya Mağara Cave, 30 October 1993, leg. P. Benda & I. Horáček.

Eptesicus serotinus (Schreber, 1774)

Algeria: 1 m, 2 f (MUB A523, A525, VMO 5135 [S+B]), Ain El Hadjad, nr. Ain Sefra, 21 July 1983, leg. J. Gaisler; – 4 m (VMO 5141–5144 [S+B]), Amentane, Aurès, S of Menaa, 8 August 1983, leg. J. Gaisler; – 1 m (MNHN 1985-659 [S+B]), Haljam, Oran, April 1961, leg. Dulcrot; – 3 m, 3 f (MUB A480–A483, VMO 5131, 5132 [S+B]), Misserghin, Oran, 14 July 1983, leg. J. Gaisler; – 1 m (MUB A457 [S+B]), Tikjda, Djurdjura, 2 July 1983, leg. J. Gaisler. – **Armenia**: 1 ind. (NMP SA82 [S+B]), nr. Erevan, 10 July 1947. – **Azerbaijan**: 1 m (ZIN 78428 [S]), Divič, 7 May 1983, leg. I. Rahmatulina; – 30 m, 4 inds. (NMP 91276–91282, 91286, 91287, 91292, 91293, 91295, 91296 [S+A], 91314–91322, 91325, 91331, 91336, 91338, 91359, 91377, 91418, 91432, 91442–91444 [S+B], 91413 [S]), Gobustan, rocky town, mine, 20 and 21 June 1979, 19 and 20 June 1981, 18 and 19 June 1982, 20 June 1983, 7 June 1985, 20 June 1986, 22 and 23 June 1987, leg. D. Frynta, P. Mácha, J. Moravec, I. Rehák, P. Roth, T. Scholz, P. Škoudlín & M. Švátora; – 1 f (ZIN 78429 [S]), Harmas, attic of the railway school, 9 July 1983, leg. I. Rahmatulina; – 2 f (ZIN 35686, 35688 [S]), Viljaš-Čaj Valley, Talyš Mts, hot springs, 15 June 1945, leg. N. Vereščagin. – **Bulgaria**: 1 m (NMP 50153 [S+B]), Batak, Cigov Čark, 10 July 1981, leg. J. Flousek, R. Fuchs & V. Vohralík; – 1 m (NMP 50320 [S+A]), Jagodina, Dolna Karanska dupka Cave, 16 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 1 m (NMP 47/72/C29 [S+B]), Jagodina, Imamova dupka Cave, 2 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 25 m, 3 f (NMP 50210, 50212, 50214, 50215, 50218, 50226–50230, 50295–50302, 50304–50313 [S+A]), Karlukovo, 5 and 6 July 1976, 14 June 1977, 8 and 9 August 1978, leg. V. Bejček, M. Braniš, P. Donát, J. Flegr, V. Hanák, I. Horáček, K. Hůrka, J. Janda, J. Jirouš, J. Škopek, V. Švihla, P. Vašák & V. Vohralík; – 1 f (NMP 50290 [S+A]), Karlukovo, Prohodna Cave, 7 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 2 m (NMP 50291, 50292 [S+A]), Karlukovo, Temnata dupka Cave, 7 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 1 m (NMP 50224 [S+A]), Karlukovo, touristic hut, 12 June 1977, leg. V. Bejček, J. Škopek, P. Vašák & V. Vohralík; – 1 m (IVB 9 [S+B]), Kavarna, 11 September 1962, leg. J. Gaisler; – 1 m (NMP 50324 [S+A]), Komunari, 12 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 1 m (NMP 50414 [S]), Ladenica peštera Cave, 31 July 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 1 m (IVB 24 [S+B]), Peštera, Ušatovi dupki Cave, 4 February 1965, leg. J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 2 m (NMP 50154, 50155 [S+B], 50396 [S+A]), Ploski, cave, 18 and 19 July 1981, 31 July 1994, leg. P. Benda, J. Flousek, R. Fuchs & V. Vohralík; – 1 m (NMP 50373 [S+A]), Reselec, 18 August 1984, leg. D. Frynta, J. Kubečka & V. Vohralík; – 1 m (ZFMK 39.24 [S+B]), Rila Mts, nr. Rilski Monastery, 30 May 1938, leg. A. von Jordan; – 1 m (NMP 49350 [S+B]), Sančeva dupka Cave, 3 August 1971, leg. J. Červený, I. Horáček, A. Taušl & D. Vítek; – 1 m (NMP 40921 [S+B]), Sliven, 13 June 1982, leg. D. Frynta, D. Holečková, I. Horáček, H. Prágerová & V. Vohralík; – 1 m (NMP 50152 [S+B]), Velingrad, Lepenica peštera Cave, 9 July 1981, leg. J. Flousek, R. Fuchs & V. Vohralík. – **Cyprus**: 1 m (NMP 90409 [S+A]), Troodos Forest, Kalidonia Trail, 12 April 2005, leg. P. Benda, I. Horáček & V. Hanák; – **Czech Republic**: 1 ind. (NMP R18 [S]), Česká Lípa, 11 September 1957, leg. Z. Veselovský; – 1 f (NMP 5/72 [S]), Chotýšany u Benešova, castle attic, 4 July 1972, leg. V. Hanák; – 1 ind. (NMP 22/87 [S]), Heřmaň, 26 September 1987, leg. M. Šálek; – 1 m (NMP 13/67 [S]), Jemniště, house attic, 11 January 1967, leg. V. Hanák; – 1 m (NMP 115/63 [S]), Lednice, 6 March 1963, leg. J. Gaisler & V. Hanák; – 5 f (NMP 491–494/59, 499/59 [S]), Lenešice u Loun, house attic, 14 May 1959, leg. V. Hanák; – 1 f (NMP 29/63 [S+B]), Macocha, Erichova Cave, 25 February 1963, leg. V. Hanák; – 1 m (NMP 311/64 [S]), Praha-Hradčany, Prague Castle, 15 April 1964, leg. L. Sigmund; – 1 m, 2 f (NMP P2, P3, P5 [S]), Praha-Nové Město, botanical garden, 18 August 1955, leg. V. Hanák; – 1 m, 1 f (NMP 747/58, 748/58 [S]), Soběslav, manse attic, 8 August 1958, leg. V. Hanák; – 2 m (NMP R74, R75 [S]), Srbsko, mines, 17 November 1957, leg. V. Hanák; – 1 m (NMP 500/58 [S]), Valtice, monastery attic, 17 June 1958, leg. V. Hanák; – 2 m (NMP ZN1, ZN2 [S]), Vranov nad Dyjí, castle attic, 31 July 1957, leg. V. Hanák; – 1 ind. (NMP 21/70 [S]), Vrchlabí, leg. P. Miles; – 1 m (NMP ZN23 [S]), Znojmo, castle attic, 3 August 1957, leg. V. Hanák. – **Georgia**: 3 f (NMP 91557, 91559, 91561 [S+B]), Džali, 14 July 1964, leg. V. Hanák. – **Greece**: 9 f (NMP 48679–48687 [S+B]), Galani, 1 km W of Toxotes, 23 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (NMP 48723 [S+A]), Kombotades, nr. Lamia, 9 September 1996, leg. M. Andreas, P. Benda & M. Uhrin; – 1 m (NMP 48646 [S]), 2 km S of Maronia, above creek, 19 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík. – **Iran**: 1 f (BMNH 77.840. [S+B]), 4 km S of Noushar, on Caspian shore, 12 May 1974, leg. E. Etemad; – 1 f (NMP 48436 [S+A]), Dehbarez, 17 April 2000, leg. P. Benda & A. Reiter; – 1 ind. (BMNH 10.8.12.1. [S+A]), Foot of Elborz, N. side, Demavend, leg. G. Barrett-Hamilton; – 1 ind. (BMNH 63.1185. [S+A]), Guter-Su, N. of Mount Sabalan, 38° 10' N, 47° 40' E, 21 August 1961, leg. Aberystwyth University Expedition; – 1 m (BMNH 77.841. [S+B]), Shehr Abad, 10 km N of Mashad, 21 August 1962, leg. E. Etemad; – 1 f (BMNH 74.11.21.31. [S+A]), Shiraz, leg. W. I. Blanford (holotype of *Vesperus shiraziensis* Dobson, 1871); – 1 f (BMNH 25.10.4.10. [S+B]), Zarghun, 52° 44' E, 29° 45' N, 5150 ft, 2 July 1920; – 3 m, 2 f (NMP 48466–48470 [S+A]), Isin, 30 April 1977, 2 May 1977, leg. B. Pražan. – **Kazakhstan**: 4 m, 7 f (MUB 1.4.63–68 [S+B], NMP 91736, 91737, 91739–91741 [S+A]), Grodikovo, school attic, 3 June 1980, leg. J. Gaisler & V. Hanák; – 1 ind. (NMP 91694 [S+B]), Voznecenobskaja, Alma-Ata Region, 5 July 1929, leg. Kolabrykov. – **Kirghizstan**: 2 m (MUB 1.4.50, NMP 91722 [S+B]), Frunze [= Bishkek], 28 May 1980, leg. J. Gaisler & V. Hanák. – **Lebanon**: 1 f (BMNH 61.419. [S+B]), American University Beirut, 6 June 1960, leg. R. E. Lewis. – **Libya**: 1 m (NMP 49855 [S+A]), Ain az-Zarqa, 10 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 m, 2 f (NMP 49950–49952 [S+A]), Ar Sharshara, 27 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 4 m (NMP 49940–49943 [S+A]), Leptis Magna, 26 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 3 m (NMP 49961–49963 [S+A]), Nanatalah, 28 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 m, 3 f (NMP 49976–49979 [S+A]), Sabratah, 28 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 f (NMP LI84 [S+B]), Tripoli, Sidi Mesri, 6 May 1980, leg. V. Hanák. – **Morocco**: 1 m (NMP 90068 [S+A]), 5 km NW of Ait-Ali, 2 September 2003, leg. P. Benda; – 1 m (NMP 90032 [S+A]), 5 km SW of Bekrite, 28 August 2003, leg. P. Benda; – 1 ind. (MNHN 1985-1983 [S]), Beni Snassen, 1955, leg. A. Brosset; – 2 m, 4 f (NMP 90086–90091 [S+A]), 5 km S of Berkane, 8 September 2003, leg. P. Benda; – 1 f (NMP 90079 [S+A]), Cascades Bou Mazouz, 6 September 2003, leg. P. Benda; – 1 m (MNHN 1985-1051 [S]), Forer de Nefifiq, 1956, leg. I. P.; – 1 m, 1 f (NMP 90093, 90094 [S+A]), Sebt-des-Ait-Serhrou, 9 September 2003, leg. P. Benda; – 2 m, 1 f (NMP 90027–90029 [S+A]), 10 km W of Tabouda, 26 August 2003, leg. P. Benda; – 1 f (NMP 90056 [S+A]), Talkout, Oued Tessaout, 30 August 2003, leg. P. Benda. – **Romania**: 1 m (BMNH 4.4.6.1. [S+B]), Buştenari, 22 April 1899, leg. W. Dodson (holotype of *Vespertilio sodalis* Barrett-Hamilton, 1910); – 1 ind. (NMP RO72 [S+B]), Peştera de la Adam, 18 July 1974, leg. J. Červený. – **Russia**: 6 f (ZIN 69912, 69913, 69917, 69918, 69920, 69922 [S]), Budennovsk, Stavropol' Region, 5 July 1983, leg. P. Strelkov; – 1 m (ZIN 82428 [S+A]), Kavkazskij Reserve, Laura Forestry, 29 July 1996, leg. K. Cyculina; – 1 m (ZIN 48051 [S]), Limančak, Abrau-Djurso, Krasnodar Region, 19 June 1958, leg. B. Bazahov; – 2 f (ZIN 78163, 78165 [S]), Mineralnye Vody, Krasnodar Region, 1 June 1990, leg. P. Strelkov; – 1 m (ZMMU S29296 [S+B]), nr. Vladikavkaz, 16 June 1923, leg. S. Ognev (holotype of *Eptesicus serotinus intermedius* Ognev, 1927); – 1 f (ZIN 48052 [S), Podkumok, Kislovodsk, 18 June 1961, leg. G. Lukina; – 1 f (ZIN 78166 [S]), Pjatigorsk, Stavropol' Region, 2 June 1990, leg. P. Strelkov; – 3 f (ZIN 78167, 78170, 78172 [S]), between the Ščelkovskaja and Starogladovskaja Stations, Chechniya, 5 June 1990, leg. P. Strelkov. – **Slovakia**: 1 f (NMP 143/61 [S]), Červená Skala, Ladzianského Cave, 15 February 1961, leg. J. Gaisler, V. Hanák & K. Hůrka; – 2 m, 1 f (NMP 664–666/59 [S+B]), Dubnica nad Váhom, church attic, 5 June 1959, leg. V. Hanák; – 1 m (NMP 149/58 [S+B]), Gombasek, Ludmila Cave, 5 February 1958, leg. V. Hanák; – 2 f (NMP CH100, CH102 [S+B]), Štúrovo, 7 July 1955, leg. V. Hanák. – **Spain**: 3 m, 1 ind. (ZFMK 34.180, 59.448, 59.449, 79.234 [S+B]), Linares de Riofrio, Salamanca, 19 June 1934, 6 August 1937, 30 September and 1 October 1959, leg. H. Grün; – 1 f, 2 inds. (ZFMK 56.723, 56.723a, 56.724 [S+B]), Sa Morena, between Sevilla and Merida, 18 May 1955, leg. J. Niethammer. – **Turkey**: 2 m, 7 f (NMW 37242–37246, 37272–37275 [S+B]), Alara Hani, 10 km NE of the Alara estuary, 16 August 1986, leg. F. Spitzenberger; – 1 ind. (NMW 34382 [S+B]), Birklin mağalari Cave, Diyarbakir Region, 27 July 1984, leg. F. Spitzenberger; – 1 m (NMP 90012 [S+A]), Tuz Gölü Lake, 7 km N of Sereflikoçhisar, 9 May 2001, leg. A. Reiter. – **Tajikistan**: 1 f (NMP 91734 [S+B]), Dušanbe, hotel, 2 June 1980, leg. J. Gaisler & V. Hanák. – **Turkmenistan**: 2 m, 7 f (NMP 91584–91586, 91663–91665, 91666–91668 [S+B]), Ašhabad, summer cinema, 28 and 30 July 1964, leg. V. Hanák; – 6 f (ZIN 59995, 59996, 59998, 60001, 60003, 60004 [S]), 10 km E of the Dušak Station, 11 and 12 May 1973, leg. P. Strelkov; – 1 f (ZIN 23723 [S]), Kuška, 13 June 1933; – 1 m (ZIN 57952 [S]), Karabil', 15 May 1971, leg. P. Strelkov; – 2 f (ZIN 60007, 60008 [S]), Karabil', Lekker, 20 May 1973, leg. P. Strelkov; – 2 f (ZIN 60011, 60012 [S]), Karabil', Išmet-Pest', 3 June 1973, leg. P. Strelkov; – 4 f (ZIN 56683, 56686, 56688, 56689 [S+B]), Morgunovka, Badhizskij Reserve, 30 April 1970, leg. P. Strelkov; – 1 f (NMP 91682 [S+B]), Repetek, 2 August 1964, leg. V. Hanák. – **Uzbekistan**: 1 f (ZIN 400-1930 [S+B]), Termez, 14 June 1930.

Eptesicus bottae (Peters, 1869)

Azerbaijan: 20 m, 3 f, 4 inds. (NMP 91283–91285, 91288–91291, 91297, 91313, 91323–91326, 91330, 91332–91335, 91337, 91341, 91357, 91373, 91392, 91419, 91420, 91440, NMW 45741 [S+B]), Gobustan, rocky town, 21 June 1979, 19 and 22 June 1981, 18 and 20 June 1982, 18 June 1983, 20 June 1984, 20 June 1986, 22 June 1987, leg. D. Frynta, P. Mácha, J. Moravec, I. Rehák, P. Roth, T. Scholz, P. Škoudlín & M. Švátora. – **Egypt**: 1 f (BMNH 19.7.7.3528. [S+A]), Cairo, leg. W. Innes (lectotype of *Vesperugo innesi* Lataste, 1887). – **Iran**: 6 m, 1 f (NMP 48114, 48115, 48364–48368 [S+A]), Bam, citadel, 6 May 1997, 8 April 2000, leg. P. Benda, P. Munclinger & A. Reiter; – 1 f (MNHG 1703.97 [S+B]), Kusheh, 13 June 1975, leg. M. Desfayes; – 1 m, 4 f (MNHG 1703.95, 1703.96, 1703.98–1703.100 [S+B]), Varaj, 13 and 14 June 1975, leg. M. Desfayes (including the holotype of *Eptesicus bottae taftanimontis* de Roguin, 1987). – **Iraq**: 2 m, 2 f (SMF 34409, 34411, 34412, 64147 [S+B]), Bagdad, 30 November 1961, leg. K. Al-Robaae; – 1 ind. (BMNH 19.3.1.1. [S+B]), Baghdad, 1 May 1917, leg. A. W. G. Hingston (holotype of *Eptesicus hingstoni* Thomas, 1919); – 2 m, 5 f (NMW 22086, SMF 34401, 34402, 34404–34407 [S+B]), Basra, October 1910, 25 November 1961, leg. V. Pietschmann & K. Al-Robaae; – 1 f (NMW 21938 [S+A]), Karbala, (October) 1841, leg. T. Kotschy; – 2 f, 6 inds. (SMF 34432–34439 [S+B]), Suleimania, 15 November 1961, leg. K. Al-Robaae. – **Jordan**: 2 m, 1 f (NMP JOR5–JOR7 [S+A]), Wadi Rum, 25 October 2004, leg. R. Lučan. – **Kirghizstan**: 2 m (CUP CT84/274, K1/88 [S+A]), Aravan, saddle, 23 August 1984, 23 June 1988, leg. J. Červený, I. Horáček & J. Obuch; – 1 f (CUP K265/88 [S+A]), Aravan, Sasyk Unkur Cave, 11 July 1988, leg. J. Červený & J. Obuch; – 5 m, 1 f (CUP K137/88, K151/88, K160/88, K174/88, K181/88, K187/88 [S+A]), Kanigut, cave, 2 July 1988, leg. J. Červený & J. Obuch. – **Oman**: 1 m (BMNH 79.162. [S+B]), Masjid Ma'illah, Jebel el Akhdar, 6100 ft, 11 April 1975, leg. D. L. Harrison (holotype of *Eptesicus bottae omanensis* Harrison, 1975). – **Saudi Arabia**: 1 m (SMF 73811 [S+B]), Misfera, 40 km N of Abha, Asir, 11 June 1987, leg. I. A. Nader. – **Tajikistan**: 1 f (ZIN 57961 [S+B]), Ajvadž, 25 May 1971, leg. P. P. Strelkov; – 1 ind. (ZIN 57306 [S+B]), Kurgan-Tjube, 17 June 1950; – 1 ind. (ZIN 57305 [S+B]), Kurgan-Tjubinskij Pass, 21 June 1950. – **Turkmenistan**: 1 f (ZIN 57962 [S+B]), Čandyr Valley, nr. Kizyl-Imam, 40 km SW of Kara-Kala, 27 April 1971, leg. P. Strelkov; – 8 f (ZIN 56095–56100, 56102, 56105 [S+B]), Jashan Lake, Karakum, 3 May 1969, leg. P. Strelkov; – 5 f (ZIN 57963–57966, 58445 [S+B]), Messerian, 75 km N of Kizyl-Atrek, mosque, 28 April 1971, leg. P. Strelkov; – 1 f (NMP 91684 [S+B]), Repetek, 2 August 1964, leg. V. Hanák; – 7 m (ZIN 59960–59966 [S+B]), Sultan Lake, 20 km W of Gaz-Ačag, 29 June 1973, leg. P. Strelkov. – **Yemen**: 1 m (MNHN 1987-297 [S]), Arabie [= SW Yemen], 1837, leg. M. Botta (holotype of *Vesperus bottae* Peters, 1868).

Eptesicus anatolicus Felten, 1971

Iran: 1 f (BMNH 2.10.1.1. [S+B]), Basht, 4000 ft, 10 June 1902, leg. H. F. Wethesby; – 1 m (NMP 48153 [S+A]), Bisotun, 8 October 1998, leg. M. Andreas & A. Reiter; – 1 f (NMP 48192 [S+A]), Boluran, 16 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin; – 1 f (NMP 48363 [S+A]), Deh Bakri, 7 April 2000, leg. P. Benda & A. Reiter; – 1 f (BMNH 5.10.4.1. [S+B]), Mala-i-Mir, 70 mi NW Ahwaz, 4300 ft, 10 April 1905, leg. R. B. Woosnam; – 1 f (NMP 48193 [S+A]), Qasr-e Shirin, 17 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin; – 1 f (BMNH 2.10.1.2. [S+B]), Telespid, 13 June 1902, leg. H. F. Wethesby. – **Turkey**: 1 f (SMF 36478 [S+B]), Alanya, 21 May 1966, leg. H. Felten (holotype of *Eptesicus anatolicus* Felten, 1971); – 1 m, 1 f (NMW 37290, 37291 [S+B]), Anamurium, 7 km SSW of Anamur, 17 August 1986, leg. F. Spitzenberger; – 3 m, 3 f (NMW 34387–34392 [S+B]), Aspendos, amphitheatre, 30 July 1984, leg. F. Spitzenberger; – 1 m, 7 f (NMW 34393–34399, 34401 [S+B]), Belkis, ruins, 30 July 1984, leg. F. Spitzenberger; – 7 f (NMW 34404, 34405, 34411, 37278–37281 [S+B]), Efes, ruins, 2 August 1984, 6 August 1986, leg. F. Spitzenberger; – 1 f (NMW 34383 [S+B]), Köprüpazarcayi, 30 July 1984, leg. F. Spitzenberger; – 1 m (NMW 37292 [S+B]), Mamure Castle, 5 km SE of Anamur, 17 August 1986, leg. F. Spitzenberger; – 1 f (NMW 37289 [S+B]), Myra, ancient ruins, 13 August 1986, leg. F. Spitzenberger; – 1 m (NMP 47925 [S+A]), Narlikuyu, Cennet Mağara Cave, 4 August 1992, leg. P. Benda; – 1 m (NMW 37277 [S+B]), Selcuk, 5 August 1986, leg. F. Spitzenberger; – 1 f (NMW 37294 [S+B]), 5 km N of Tasucu, cistern, 18 August 1986, leg. F. Spitzenberger.

Hypsugo savii (Bonaparte, 1837)

Algeria: 1 m, 3 f (ISEA 1433, 1434, MUB A517, A518 [S+B]), Amentane, Aurès, 8 August 1983, leg. J. Gaisler, K. Kowalski & B. Rzebik-Kowalska; – 1 f (ISEA 1478 [S+B]), Bouire, 14 August 1983, leg. leg. K. Kowalski & B. Rzebik-Kowalska; – 4 m, 2 f (ISEA 1466–1468, MUB A465, A472 [S+B]), Tikdja, Djurdjura, cave, 2 July and 13 August 1983, leg. leg. J. Gaisler, K. Kowalski & B. Rzebik-Kowalska; – 1 m (MUB A512 [S+B]), Timgad, Byzantine fortress, 8 August 1983, leg. leg. J. Gaisler. – **Azerbaijan**: 1 ind. (ZMMU S84994 [S]), Azerbaijan (undef.), in a canyon, December 1968, leg. Kameneva; – 4 m, 3 inds. (NMP 91339, 91342, 91356, 91358, 91374–91376 [S+B]), Gobustan, mine, 19 June 1982, 19 and 20 June 1983, leg. P. Mácha, P. Roth, T. Scholz & P. Škoudlín. – **Bulgaria**: 1 m (NMP 50057 [S+B]), Bukovec, Tvardiški Pass, 17 July 1987, leg. P. Musil; – 1 m (NMNHS N47 [S]), Eleshnica, Rila Mts, 22 July 1993, leg. T. Ivanova & I. Mitko; – 1 m (NMNHS N79 [S]), Evksinograd, 7 October 1926, leg. I. Bureš; – 9 m, 2 f (CUP B740–B742, B751, B755, B763, B767, B778, NMP 50430 [S], 50156, 50157 [S+B]), Gorna Breznica, 15 and 16 July 1981, 15 and 19 July

1982, leg. J. Flousek, D. Frynta, R. Fuchs, D. Holečková, I. Horáček, H. Prágerová & V. Vohralík; – 1 f (CUP B498 [S]), Jagodina, Sančeva dupka Cave, 15 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 5 m, 2 f (CUP B519, B521, B522, B526, B527, NMP 50427, 50428 [S]), Jagodina, Dolna Karanska dupka Cave, 16 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 7 m, 3 f (CUP B262, B280, B444, B446, B455, B458, B459, B463, NMP 50425, 50426 [S]), Karlukovo, 14 and 15 June 1977, 8 and 9 August 1978, leg. V. Bejček, P. Donát, J. Flegr, J. Janda, J. Škopek, P. Vašák & V. Vohralík; – 1 m (NMP 49667 [S]), Karlukovo, Čerdženica Cave, 6 July 1975, leg. J. Červený; – 1 m (CUP B249 [S]), Karlukovo, Prohodna Cave, 13 June 1977, leg. V. Bejček, J. Škopek, P. Vašák & V. Vohralík; – 1 m (CUP B443 [S]), Karlukovo, Temnata dupka Cave, 7 August 1978, leg. P. Donát, J. Flegr, J. Janda & V. Vohralík; – 1 f (CUP B234 [S]), Karlukovo, touristic hut, 12 June 1977, leg. V. Bejček, J. Škopek, P. Vašák & V. Vohralík; – 1 m, 1 f (CUP B534, B535 [S]), Komunari, 12 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 6 m (NMP 49996, 50043, 50335–50338 [S+A]), Orehovo, 24 August 1980, 29 June 1984, leg. D. Holečková, J. Jirouš, D. Král, H. Prágerová, T. Scholz & V. Vohralík; – 1 m (CUP B801 [S]), Rakovskovo, Obzor, 21 August 1983, leg. K. Hůrka, I. Horáček & V. Vohralík; – 1 m, 1 f (CUP B536 [S], NMP 40924 [S+B]), Sliven, 13 July 1979, 10 June 1982, leg. D. Frynta, D. Holečková, P. Donát, I. Horáček, J. Jirouš, H. Prágerová & V. Vohralík; – 2 m (IVB 1 [S+B], NMNHS N104 [S]), Sofija, 1 February 1965, 23 April 1997, leg. V. Beškov & P. Beron; – 1 m (NMNHS N51 [S]), Sofija, Krasno Selo, September 1995, leg. R. Pandurska. – **Croatia**: 1 m (CUP YU1/75 [S]), Baška Voda, 26 June 1977, leg. J. Červený. – **Cyprus**: 1 m (NMP 90431 [S+A]), Kantara Castle, 18 April 2005, leg. P. Benda, V. Hanák & I. Horáček; – 1 m (NMP 90410 [S+A]), Troodos Forest, 2 km S of Troodos, Kalidonia Trail, Kryos River, 12 April 2005, leg. P. Benda, V. Hanák & I. Horáček; – 1 f (NMP 91220 [S+A]), Troodos Forest, 3 km W of Troodos, Hadjipavlou mine, 14 October 2005, leg. I. Horáček, P. Hulva & R. Lučan; – 1 m (NMP 91210 [S+A]), Troodos Forest, 4.5 km SW of Kakopetria, 13 October 2005, leg. I. Horáček, P. Hulva & R. Lučan; – 1 m (NMP 90407 [S+A]), Troodos Forest, valley N of Kakopetria, 11 April 2005, leg. P. Benda & V. Hanák. – **Greece**: 1 m (NMP 49029 [S+A]), Anthiro, above river, 31 August 2001, leg. P. Benda; – 2 f (NMP 48701, 48702 [S+B]), Asproklisi, 1 July 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (NMP 48678 [S+B]), Galani, 1 km W of Toxotes, 23 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; –1 m (NMP 48571 [S+B]), Micro Pappigo, 25 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m (NMP 48730 [S+A]), Neo Proastio, cave, 12 September 1996, leg. P. Benda & M. Uhrin; – 1 m (NMP 48577 [S+B]), Pappigo, Tymphi Mts, cave, 26 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m (NMP 48565 [S+B]), Paralia Skotinas, estuary, 19 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m, 1 f (NMP 48731, 48732 [S+A]), Trahila, cave, 13 September 1996, leg. P. Benda & M. Uhrin; – 1 f (NMP 48696 [S]), Thassos, 1 km W of the Arhangelou Monastery, 26 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 2 m (NMP 48689, 48690 [S+B]), Thassos, Panagia, Drakotrypa Cave, 24 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 3 m, 1 f (NMP 48691–48694 [S+B]), Thassos, Theologos, above creek, 25 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 2 m, 1 f (NMP 91109–91111 [S+A]), Crete, Milatos, Milatou Cave, 7 October 2006, leg. P. Benda, V. Hanák & P. Hulva; – 1 m, 1 f (NMP 91083 [S+A], 91082 [A]), Crete, Patsos, Agios Antonias Cave, 3 October 2006, leg. P. Benda, V. Hanák & P. Hulva; – 2 m, 1 f (NMP 91094, 91095 [S+A]), 91096 [S]), Crete, Dramia, Gefyra Petre Bridge, 6 October 2006, leg. P. Benda, V. Hanák & P. Hulva; – 2 m (NMP 91088, 91089 [S+A]), Crete, Meskla, 5 October 2006, leg. P. Benda, V. Hanák & P. Hulva. – **Iran**: 1 m (NMP 90824 [S+A]), 5 km S of Mina, 22 May 2006, leg. P. Benda & A. Reiter; – 1 m (NMP 48118 [S+A]), Pishqaleh, 12 May 1997, leg. P. Benda; – 1 m (NMP 90790 [S+A]), Rubat Sharaf Caravanserai, 18 May 2006, leg. P. Benda & A. Reiter. – **Italy**: 6 m (SMF 17017–17022 [S+B]), Ficuzza nr. Palermo, Sicily, 9 June 1955; – 2 m, 1 f (SMF 17023–17025 [S+B]), Linguaglossa, Sicily, 10 July 1955; – 1 m (SMF 16991 [S+B]), Messina, Sicily, 2 July 1955; – 2 m, 29 f (SMF 17026–17028, 17030–17038, 17041, 17043–17045, 17047, 17049, 17050, 17052–17059, 17061, 17063, 17068, 17071 [S+B]), Siracuza, Sicily, 22 July 1955. – **Lebanon**: 3 m, 1 f (NMP LE106, LE108, LE197, 90900 [S+A]), Afqa Cave, 26 June and 15 July 2006, leg. P. Benda, I. Horáček & P. Hulva; – 2 m (NMP LE99, LE100 [S+A]), Er Rouais Cave, 26 June 2006, leg. R. Lučan; – 6 m (NMP LE27, LE29–LE33 [S+A]), Jezzine, Pont al Khalass, 23 June 2006, leg. I. Horáček, P. Hulva & R. Lučan; – 3 m (NMP LE205–LE207 [S+A]), Ras el Assi, monastery, 29 June 2006, leg. I. Horáček, P. Hulva & R. Lučan. – **Morocco**: 1 m (NMP 90070 [S+A]), Gorge Todra, 5 km NE of Tamtattouchte, 3 September 2003, leg. P. Benda. – **Spain**: 3 m (SMF 18700–18702 [S+B]), Nava de San Pedro, Sierra de Cazorla, 1350 m, 14 May 1959, leg. K. Klemmer.

Pipistrellus pipistrellus (Schreber, 1774)

Algeria: 1 m (MUB A526 [S+B]), Kef Larous, Aures, 9 August 1983, leg. J. Gaisler; – 5 m, 3 f (MUB A042, A060, A100, A181, A182, A199, A256, A417 [S+B]), Setif, citadel, 20 and 30 May, 7 October, and 16 December 1981, 10 January and 16 May 1982, 6 April 1983, leg. J. Gaisler; – 2 m, 1 f (MUB A534–A536 [S+B]), Yakouren, Tizi Ozou, 11 August 1983, leg. J. Gaisler. – **Bulgaria**: 1 m (NMP 50439 [A]), Lakatnik, Suhata peštera Cave, 16 December 2002, leg. P. Benda & T. Ivanova. – **Cyprus**: 1 m (MHNG 1807.089 [S+A]), Troodos Forest, Kryos River, 5 September 2000, leg. M. Ruedi. – **Czech Republic**: 1 f (SMZ 6688 [S+A]), Boskovštejn, 10 July 2001, leg. A. Reiter; – 1 f (NMP 90013 [S+A]), Brno, Lidická street, 19 August 2000, leg. Z. Řehák; – 2 f (SMZ 6695, 6696 [S+A]), Čížov, Ledové sluje Cave, 15 August 2001, leg. A. Reiter; – 1 m (SMZ 6692 [S+A]), Onšov, pools, 18 August 2001, leg. A. Reiter; – 1 m (NMP 90134 [S+A]), Velký Jindřichov u Benešova n. Č., 31 July 2001, leg. V. Hanák. – **France**: 1 m (MHNG 1813.035 [S+A]), Collogne sous

Salève, Haute-Savoie, 16 August 2001, leg. M. Chanson. – **Greece**: 1 m (MHNG 1807.055 [S+A]), Mt. Parnass, Corycian Grotta, 31 July 2000, leg. M. Ruedi; – 1 m (MHNG 1807.052 [S+A]), Prespa, Pili, 13 July 2000, leg. M. Ruedi. – **Iran**: 1 f (NMP 48155 [S+A]), Dorud, 9 October 1998, leg. P. Benda & M. Uhrin; – 1 m (NMP 90832 [S+A]), 10 km NW of Emam Qoli, 24 May 2006, leg. P. Benda & A. Reiter; – 1 f (NMP 90776 [S+A]), 2 km S of Karizbalagh, 17 May 2006, leg. P. Benda & A. Reiter; – 5 m, 4 f (NMP 90873–90877, 90879, 90880 [S+A], 90878, 90881 [A]), Korud Abad, 2 km SE of Ali Abad, 28 May 2006; – 1 m (SMF 46397 [S+B]), Rafsanjan, 1972, leg. Pflanzeninstitut; – 1 m (NMP 90791 [S+A]), Shurlaq, 18 May 2006, leg. P. Benda & A. Reiter; – 2 m, 2 f (NMP 90838, 90840, 90841 [S+A], 90839 [A]), 2 km E of Tunel-e-Golestan, 26 May 2006, leg. P. Benda & A. Reiter; – 5 m (NMP 90885–90887, 90889 [S+A], 90888 [A]), 5 km S of Tutaki, 3 June 2006, leg. P. Benda & A. Reiter; – 1 m, 1 f (NMP 48112, 48113 [S+A]), Yazd, Towers of Silence, 4 May 1997, leg. P. Benda. – **Morocco**: 1 f (NMP 90033 [S+A]), Bekrite nr. Azrou, 28 August 2003, leg. P. Benda; – 1 m (NMP 90069 [S+A]), Gorges du Dadès, 2 September 2003, leg. P. Benda; – 2 m, 3 f, 2 inds. (NMP 90074–90077 [S+A], 90073 [A], SMO 6486, 6487 [S+B]), Gorges du Todra, 5 km SW of Tamtattouchte, 27 June 1993, 3 September 2003, leg. P. Benda & Z. Řehák. – **Slovakia**: 1 m, 1 f (NMP 90014, 90015 [S+A]), Tisovec, Slávča, 24 July 2002, leg. P. Benda, E. Hapl & M. Uhrin; – 2 m, 5 f (NMP 90016–90022 [S+A]), Zadiel, Erňa Cave, 20 April 2003, leg. P. Benda, V. Hanák & M. Uhrin. – **Switzerland**: 1 m (MHNG 1882.055 [S+A]), Genève, Bernex, 4 August 2003, leg. M. Bussard. – **Turkey**: 3 f (SMF 36474–36476 [S]), nr. Pazarköy, 12 km SE of Egridir, 27 May 1966, leg. H. Felten & D. Kock.

Pipistrellus kuhlii (Kuhl, 1817)

Afghanistan: 2 f, 1 ind. (SMF 38919, 38926, 38927 [S+A]), Dilaram, Farah, 3 March and 30 August 1965, leg. D. Meyer-Oehme; – 1 m (SMF 38928 [S+A]), Khost (Band-e-Barq), Paktia, 5 August 1965, leg. D. Meyer-Oehme; – 1 m, 1 f (SMF 38925, 38931 [S+B]), Spin Boldak, Kandahar, 25 August 1965, leg. D. Meyer-Oehme. – **Algeria**: 1 m (ISEA 9424 [S+B]), Arba Tahtani, 31 October 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m, 1 f (ISEA 9421, 9446 [S+B]), Benni Abbès, 16 May 1981, 19 July 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 f (ISEA 9453 [S+B]), Bouira, 14 August 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 2 m, 1 f (ISEA 9447, 9448, 9450 [S+B]), Brezina, 23–24 July 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (ZFMK 54.2 [S]), Djelfa, 18 July 1950; – 2 f (ISEA 9438, 9439 [S+B]), Es Senia nr. Oran, 23 April 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 5 m (ISEA 9434, 9436, 9437, 9443, 9455 [S+B]), Les Andalouses, 8 October and 5 November 1982, 21 January, 24 June and 9 October 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m, 4 f (ISEA 9422, 9433, 9440, 9441, 9444 [S+B]), Misserghin, 14 June 1981, 22 June 1982, 13 June and 14 July 1982, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (ISEA 9432 [S+B]), Oran, 21 June 1982, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m, 2 f (ISEA 9430, 9431, 9435 [S+B]), Oued Tlelat, 8 June 1982, 18 October 1982, leg. K. Kowalski & B. Rzebik-Kowalska; – 2 f (ISEA 9428, 9429 [S+B]), Sebdou, 30 April 1982, leg. K. Kowalski & B. Rzebik-Kowalska; – 2 m, 1 f (ISEA 9425–9427 [S+B]), Setif, 16 December 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 f (ISEA 9451 [S+B]), Yakouren, 11 August 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 2 inds. (MNHN 1962-1770a, 1770b [S]), Algeria (undef.). – **Croatia**: 2 f (SMF 23402, 23403 [S+B], Primošten, 30 km S of Šibenik, 27 September 1964, leg. H. Coffler & K. Walch; – 5 m, 1 f (SMF 23399, 23401, 23404, 23405 23407 [S+B], 23400 [S]), Zadar, 26, 29 and 30 September 1964, leg. H. Coffler & K. Walch. – **Egypt**: 2 m (IVB 2, 3 [S+B]), Abu Rawash, 19 April 1969, leg. J. Gaisler; – 1 ind. (SMF 22014 [S+A]), betw. Cairo and Ismaila, 5 September 1962, leg. R. Rau; – 1 m (IVB 4 [S+B]), Burgh el Arab, 14 May 1969, leg. J. Gaisler; – 1 m (SMF 26114 [S+A]), Bahig, Western Desert, 16 August 1965, leg. Linsenmair & Kiepenhauer; – 1 ind. (SMF 4307 [S]), Nubien and petraeischen Arabien [= Egypt], 1822, leg. E. Rüppell (lectotype of *Vespertilio marginatus* Cretzschmar, 1830). – **France**: 1 m (MHNG 1882.050 [S+A]), Ain, Seyssel, 26 August 2003, leg. N. Chardonnens; – 1 m (MNHN 1997-313 [S]), Camargue, leg. H. Heim de Balsac; – 1 m, 1 f (MNHN 1980-453, 1980-454 [S]), Digne, 8 September 1908, leg. C. Mottaz; – 1 ind. (MHNG 1255.32 [S+A]), Chambord, Pavillon de Mon frault, June 1943, leg. F. Chanudet; – 1 m (MNHN 1985-1977 [S]), Thaars, July 1951, leg. D. Senes. – **Greece**: 1 f (NMP 49022 [S+A]), Artiki, 25 August 2001, leg. P. Benda; – 1 m, 1 f (NMP 48703, 48704 [S+B]), Asproklíssi, 1 July 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 f (SMF 28220 [S+B]), Kourna Lake nr. Mouri, Crete, 15 April 1958, leg. H. Kahmann; – 4 f (ZFMK 62.59–62.62 [S+B]), Mesologgi, 3 April 1962, leg. O. von Helversen; – 2 f (NMP 48705, 48706 [S+B]), Mesopotamo, 2 July 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 m (NMP 48555 [S+B]), Ormylia, 14 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m, 1 f (NMP 48561, 48562 [S+B]), Paralia Skotinas, 19 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m (ZFMK 59.429 [S+B]), Perivolo nr. Patras, 21 May 1959, leg. Buchholz & Forst; – 3 f (NMP 49013–49015 [S+A]), Simopoulo, 23 August 2001, leg. P. Benda; – 1 m, 6 f (SMF 45213–45219 [S+B]), Skiathos, N Sporades, 16, 18 and 21 October 1973, leg. D. Kock & G. Storch; – 1 m, 4 f (NMP 48733–48737 [S+A]), Spárti, 16 September 1996, leg. P. Benda & M. Uhrin; – 2 m, 1 f (SMF 26791, 26793–26795 [S+B]), Tegea, 16 August 1960, leg. H. Kahmann. – **Iran**: 4 m, 3 f (NMP 48116, 48369–48374 [S+A]), Bam, citadel, 6 May 1997, 8 April 2000, leg. P. Benda, P. Munclinger & A. Reiter; – 1 f (NMP 48121 [S+A]), Bastam, 1 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin; – 5 m, 6 f (NMP 48427–48431, 48433 [S+A], 48425, 48426, 48432, 48434, 48435 [S]), Chah-e Dad Khoda, 16 April 2000, leg. P. Benda & A. Reiter; – 1 m, 1 f (NMP 48190, 48191 [S+A]), Choqa Zanbil, 15 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin; – 1 m (NMP 48403 [S+A]), Pir Sohrab, 12 April 2000, leg. P. Benda & A. Reiter; – 2 m, 1 f (NMP 48455–48457 [S+A]), Posht

Chenar, 20 April 2000, leg. P. Benda & A. Reiter; – 1 f (SMF 46398 [S+A]), Rafsanjan, 21 April 1974, leg. H. Felten & K. Walch; – 4 m (SMF 34355–3457, 34362 [S+A]), Shush, 21–24 September 1957, leg. K. Al-Robbae; – 2 m (NMP 48160, 48161 [S+A]), Si Mili, 12 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin; – 1 m (SMF 47843 [S+B]), Tabriz, 1970, leg. Herbst. – **Iraq**: 3 m, 4 f, 1 ind. (NMW 21941–21943, 26341–26344 [S+B], 21944 [S]), Babylon, October–November 1841, 27 August 1910, leg. T. Kotschy & V. Pietschmann; – 2 f (NMW 26307, 26308 [S+B]), Kalaat Schergat, 12 May 1910, leg. V Pietschmann; – 2 m, 5 f (NMW 26309–26315 [S+A]), Karbala, 18 April 1910, leg. V. Pietschmann; – 1 m, 3 f (NMW 26346–16349 [S+B]), Mosul, 18–31 May 1910, leg. V. Pietschmann. – **Italy**: 1 m (SMF 16989 [S+B], Favignana (Trapani), Aegedic Isl., 17 May 1955, leg. K. Klemmer & H. Krampitz; – 4 m, 1 f (MHNG 1716.87 [S], SMF 50430–50433 [S+A]), Florence, 2 May 1911, 6 May 1976, leg. K. Walch; – 3 m, 6 f (SMF 16992–17000, 17014 [S+A]), Linguaglossa, Sicily, 9 and 11 July 1955, leg. K. Klemmer & H. Krampitz; – 1 m (SMF 35536 [S+A]), Palermo, Sicily; – 3 m, 6 f (SMF 37056, 37057, 37059, 37061–37063, 37066–37068 [S+B]), Pantelleria Isl., 19 September 1969, leg. H. Felten & G. Storch. – **Libya**: 1 m (NMP 49843 [S+A]), Al Jawsh, 7 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 f (NMP 48332 [S+A]), 20 km N of Al Qusbat, 11 October 1999, leg. P. Benda; – 1 m (NMP 49893 [S+A]), Wadi Al Kuf, 5 km SW of Al Bayda, 19 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 f (NMP 48326 [S+A]), Al Aquriyah (Tokra), 9 October 1999, leg. P. Benda; – 2 m, 2 f (NMP 49933, 49934, 49936, 49937 [S+A]), Al Rajmah, 23 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 2 m, 4 f (NMP 49953–49955, 49958–49960 [S+A]), Ar Sharshara, 27 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 f (NMP 49939 [S+A]), Jalu, 24 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 3 m, 3 f (NMP 49968–49970, 49972–49974 [S+A]), Nanatalah, 28 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 m (NMP 48322 [S+A]), Sabkhat Karkurah, 8 October 1999, leg. P. Benda; – 3 m (NMP 49981–49983 [S+A]), Sabratah, 28 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 m, 1 f (NMP 49921, 49923 [S+A]), Sidi Mohammad Al Mablehut, 22 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 3 m, 6 f (NMP 49845–49851, 49853, 49859 [S+A]), Sinawan, 8 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 2 f (NMP 49930, 49931 [S+A]), Tolmeita, 22 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin; – 1 m (MHNG 987.14 [S]), Tripoli, 1918, leg. Taubert; – 2 m (NMP 49917, 49918 [S+A]), estuary of the Wadi Al Kuf, 20 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin. – **Morocco**: 2 f (NMP 90066, 90067 [S+A]), an oasis ca. 5 km NW of Âït-Saoun, 1 September 2003, leg. P. Benda; – 3 m, 1 f (SMF 47747–47780 [S+B]), Dekeira nr. Inezgane, Oued Sous, 31 January 1975, leg. M. Dachsel; – 2 m, 3 f (NMP 90096, 90097 [A], 90095, 90098, 90099 [S+A]), Oued el Ammar, 1 km N of Sebt-es-Âït-Serhrouchèn, 9 September 2003, leg. P. Benda; – 1 m, 3 f (NMP 90082–90085 [S+A]), Oued Isly, Sidi Moussa, 10 km N of Guenfouda, 7 September 2003, leg. P. Benda; – 1 m (NMP 90024 [S+A]), Oued Makhazen, ca. 10 km W of Souk-Khémis-des-Beni-Arouss, 25 August 2003, leg. P. Benda; – 1 m (NMP 90030 [S+A]), a river bridge ca. 10 km W of Tabouda, 26 August 2003, leg. P. Benda; – 1 f (ZFMK 97.177 [S+B]), Tizin-Test Pass, 11 September 1969, leg. G. Rheinwald. – **Spain**: 3 m, 3 f, 1 ind. (ZFMK 34.119–34.125 [S+B]), Langunilla, Bejar, Salamanca, 1–4 June 1934, leg. H. Grün; – 2 m, 6 f (SMF 18689–18694, 18704, 18705 [S+A]), Nava de San Pedro, Sierra de Cazorla, 14 May 1959, leg. K. Klemmer. – **Switzerland**: 3 m, 3 f (MHNG 898.38 [S], 1826.026, 1826.027, 1828.068, 1869.032, 1882.052 [S+A]), Genève, 22 September 1951, 1 and 7 September 2001, 24 May 2002, 1 March and 15 July 2003, leg. de Giorgi and others; – 1 f (MHNG 1828.067 [S+A]), Chêne-Bourg nr. Genève, 19 December 2001; – 1 m (MHNG 1813.034 [S+A]), Plan-les-Ouates nr. Genève, 7 September 2000, leg. A. Keller; – 1 f (MHNG 1807.028 [S+A]), Veyrier nr. Genève, 21 August 2000, leg. M. Ruedi; – 1 m (MHNG 1868.076 [S+A]), Châteauneuf, 29 June 2001, leg. R. Arlettaz; – 3 m (MHNG 1806.038, 1868.075 [S+A], 1868.073 [S]), Sion, 10 August 1990, 7 April and 3 August 1999, leg. R. Arlettaz. – **Tunisia**: 2 m, 2 f (ZFMK 59.269–59.271, SMF 19551 [S+B]), Carthago, 14 March 1959, 6 March 1961, leg. H. Roer & K. Walch; – 1 m, 2 f (SMF 83440–83442 [S+B]), Douz, Nefzaoua, 29 and 30 April 1994, leg. D. Kock & C. Winter; – 1 f (ZFMK 97.169 [S+B]), El Haouaria, 19 March 1957, leg. J. Niethammer; – 1 m, 1 ind. (MHNG 921.16, ZFMK 97.174 [S]), Gabès, 1922, 1956, leg. Sicard, leg. M. Costan; – 1 m (MHNG 1684.56 [S]), 100 km S Gabès, 1984, leg. P. Gaucher & A. Brosset; – 1 m, 1 f (SMF 41617, 41618 [S+A]), Galita Archipelago, Ile de la Galite, 29 August 1971, leg. K. Schuberth, I. Vesmanis & F. Charousset; – 3 m (SMF 41619–41621 [S+A]), Kebili, 18 March 1971, leg. K. Schuberth, I. Vesmanis & P. Nagel; – 1 ind. (MNHN 1995-1702 [S+B]), Tunisia (undef.). – **Turkey**: 1 f (SMF 36754 [S+A]), Alanya, Incekum, 24 May 1966, leg. H. Felten et al.; – 5 m, 5 f (SMF 42352–42358, 42361–42363 [S+A]), Alişam, 17 and 25–27 September 1971, leg. D. Kock, F. Malec & G. Storch; – 1 ind. (ZFMK 85.87 [S+B]), Birecik, 28 March 1973, leg. U. Hirsch; – 1 m, 1 f (ZFMK 68.244, 68.245 [S+B]), Ceylanpinar, 18 May 1968, leg. H. Mittendorf.

Nyctalus noctula (Schreber, 1774)

Bulgaria: 1 m, 1 f (NMP 50148, 50149 [S]), Albena, 14 October 1965, leg. P. Beron; – 1 ind. (NMNHS unnumbered [S]), Dragalevci nr. Sofia, 7 August 1964, leg. P. Beron; – 4 m, 1 f (NMP 49366, 49739–49741, 49768 [S+A]), Karlukovo, 6 July 1976, 9 August 1978, leg. M. Braniš, P. Donát, J. Flegr, V. Hanák, I. Horáček, K. Hůrka, J. Janda, J. Jirouš, V. Švihla & V. Vohralík; – 1 ind. (IVB 9 [S]), Karlukovo, Troevratica Cave, 2 October 1962, leg. J. Gaisler; – 2 m (NMP 49639, 49746 [S+A]), Karlukovo, Prohodna Cave, 13 June 1977, 7 August 1978, leg. V. Bejček, P. Donát, J. Flegr, J.

Janda, J. Škopek, P. Vašák & V. Vohralík; – 1 m (NMP 49348 [S+B]), Petrič, 19 June 1957, leg. V. Hanák; – 1 f (NMNHS unnumbered [S]), Bulgaria (undef.), 7 August 1969. – **Czech Republic**: 1 f (NMP 482/59 [S]), Břve, tree hollow, 1 May 1959, leg. P. Miles; – 1 f (NMP 657/58 [S]), Číměř, Krvavý Fishpond, 2 August 1958, leg. V. Hanák; – 1 f (NMP 148/65 [S]), Horusice, Kvíčadlo Fishpond, 1 May 1965, leg. V. Hanák; – 10 m, 2 ind. (NMP 29–35/74, 25/76, 28/76, 29/74, 8/77, 13/77 [S]), Horusice, Ruda Forestry, 9 and 12 October 1974, 30 September 1976, 24 August 1977, leg. V. Hanák; – 1 f (NMP 853/58 [S]), Jindřichův Hradec, Kacležský Fishpond, 1 October 1958, leg. B. Král; – 3 m, 4 f, 1 ind. (NMP 810/58, 811/58, 813/58, 814/58, 506/59, 740/59, 739/59, E122 [S]), Klec, Potěšil Fishpond, 13 May 1957, 15 September 1958, 24 May and 4 July 1959, leg. V. Hanák; – 1 f (NMP 49/75 [S]), Kolešovice u Rakovníka, 3 April 1975, ded. V. Hanák; – 1 m, 1 f (NMP D17, D18 [S]), Lomnice nad Lužnicí, Velký Tisý Fishpond, 5 October 1956, leg. V. Hanák; – 3 inds. (NMP unnumbered [S]), Praha-Nové Město, Emauzy Monastery, leg. V. Hanák; – 8 m (NMP 33/68, 36/68, 14/70, 9/72, 18–21/78 [S]), Praha-Záběhlice, 17 April 1968, 24 February 1970, 12 September 1972, 30 January 1978, leg. V. Hanák; – 1 m (NMP 37/74 [S]), Srbsko, 19 November 1974, leg. V. Bejček; – 1 m (NMP 469/58 [S]), Stará Hlína u Třeboně, 27 October 1958, leg. V. Hanák; – 1 m, 1 f (NMP P9, B58 [S]), Tchořovice, Velký Pálenec Fishpond, 3 October 1955, 5 June 1956, leg. V. Hanák. – **Germany**: 1 m (ZFMK 35.240 [S+B]), Augsburg, 6 March 1924, leg. A. Fischer; – 1 ind. (ZFMK 82.239 [S+Sk]), Hambacher Forst nr. Köln/Tagebau, 6 June 1982; – 1 ind. (ZFMK 35.241 [S+B]), Lohr am Mein, 21 March 1924, leg. A. Fischer; – 1 f (ZFMK 46.294 [S+B]), Möggingen nr. Radolfzell, Bodensee, 14 January 1946, leg. Freiherr von Bodmann; – 1 m (ZFMK 54.9 [S+B]), Pleisse/Wald nr. Leipzig, 22 January 1952; – 1 f (ZFMK 37.130 [S+B]), Reipzig nr. Frankfurt/Oder, 24 January 1936, leg. G. Stein; – 1 m (ZFMK 2003.862 [S+Sk+B]), Villip (NRW), October 1999, leg. H. Roer. – **Greece**: 1 f (NMP 49032 [S+A]), Anthiro, above river, 31 August 2001, leg. P. Benda; – 1 m (NMP 48695 [S+B]), Thassos Island, Theologos, above creek, 25 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík. – **Kirghizstan**: 8 m (MUB 1.4.43–1.4.49 [S+B], NMP 91721 [S+A]), Frunze (= Bishkek), park, 28 May 1980, leg. J. Gaisler & V. Hanák. – **Lebanon**: 1 m (BMNH 61.406. [S+B]), Natural Bridge, Faraya, 29 July 1960, leg. R. E. Lewis (holotype of *Nyctalus noctula lebanoticus* Harrison, 1962). – **Serbia**: 2 m, 3 f (ZFMK 36.329, 36.331–36.334 [S+B]), Fruška gora, Matina Ugljara, 29 March 1936, leg. H. Müche; – 6 inds. (ZFMK 36.30a–36.30f [S+B]), Stari Futog, November 1935, leg. H. Müche. – **Slovakia**: 2 m (NMP 90626, 90627 [S+A]), Zlatno, Za Havraník Valley, 2 August 2005, leg. P. Benda & M. Uhrin. – **Turkey**: 2 m, 1 f (CUP T93/2, T93/3, NMP 47950 [S+A]), Velika Köprüsü Bridge, 15 October 1993, 31 August 1996, leg. M. Andreas, P. Benda, I. Horáček & M. Uhrin.

Otonycteris hemprichii Peters, 1859

Algeria: 1 m, 1 ind. (MUB A494, A495, ISEA 9594 [S+B], 9595 [B]), Abadla, 20 July 1983, leg. J. Gaisler, K. Kowalski & B. Rzebik-Kowalska; – 2 f (ZMB 74754, 74759 [S+A]), Algier, leg. Spatz; – 1 f (ISEA 9593 [S+B]), Benni Abbes, 19 July 1983, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (ISEA 9592 [S+B]), Brezina, 31 October 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 ind. (ISEA 1122 [S]), Algeria (undef.). – **Egypt**: 1 f, 2 inds. (CUP E25, E41, NMP E40 [S+B]), Abu Rawash, 19 July and 18 October 1971, leg. J. Groschaft & B. Ryšavý; – 2 inds. (ZMB 441, 442 [B, S inside]), Ägypten [= the Nil valley between Aswan, Egypt, and Khondek, Sudan], [between September 1821 and 21 July 1822], leg. F. Hemprich & C. Ehrenberg (syntypes of *Otonycteris hemprichii* Peters, 1859); – 1 f, 1 ind. (NMP E33, E35 [S+B]), Al Fayum, 25 July 1971, leg. B. Ryšavý; – 1 m (SMF 25268 [S]), nr. Cairo, 1959, leg. E. Kulzer; – 2 m (IVB E251, E252 (S+B]), Kharga Oasis, 6 May 1969, leg. J. Gaisler; – 1 m, 1 f (NMP 90495, 90500 [S+A]), Wadi Feiran, Sinai, 8 and 10 September 2005, leg. M. Andreas, P. Benda, J. Hotový & R. Lučan. – **Iran**: 3 f (NMP 48440–48442 [S+A]), Dehbarez, 17 April 2000, leg. P. Benda & A. Reiter; – 1 f (NMP 48111 [S+A]), Espidan, 3 May 1997, leg. P. Benda & J. Obuch; – 1 ind. (NMP 48376 [S+Sk]), Gegan, 9 April 2000, leg. P. Benda & A. Reiter; – 2 m, 2 f (NMP 48396–48399 [S+A]), Pir Sohrab, 12 Aparil 2000, leg. P. Benda & A. Reiter; – 1 f (NMP 48424 [S+A]), Tujak, 15 April 2000, leg. P. Benda & A. Reiter. – **Libya**: 1 m (NMP 49964 [S+A]), Nanatalah, 28 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin. – **Morocco**: 1 m, 3 f (NMP 90061–90064 [S+A]), 5 km NW of Anagam, Oued Drâa, 31 August 2003, leg. P. Benda. – **Saudi Arabia**: 1 ind. (ZFMK 97.149 [S]), ca. 100 km NE of Riyad, Thumama NP, March–April 1985, leg. J. Szij. – **Sudan**: 1 ind. (NMW 8604 [S]), Batn el Hajjar (holotype of *Plecotus ustus* Fitzinger, 1866). – **Turkey**: 1 m (ZFMK 72.140 [S+B]), Birecik, 11 May 1972, leg. U. Hirsch.

Plecotus macrobullaris Kuzjakin, 1965

Armenia: 1 f (ZIN 72366 [S+A]), Mormarik river nr. Ankovan, 8 August 1971, leg. E. Javrujan & L. Saharjan; – 1 m (ZIN 21442 [S+B]), Tel', N shore of Lake Gokča (= Sevan), 15 November 1931, leg. A. Argiropulo. – **Georgia**: 1 m (ZIN 8699 [S+A]), Ahalkalaki, 1894, leg. Jablokov. – **Iran**: 2 m, 6 f (NMP 90767–90774 [S+A]), 12 km NW of Aftar, 14 May 2006, leg. P. Benda & A. Reiter; – 2 m, 5 f (NMP 48123–48127, 48129 [S+A], 48128 [S+B]), 10 km SE of Choplu, 2 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin; – 4 m (NMP 48138–48141 [S+A]), Takht-e Suleyman, 3 October 1998, leg. M. Andreas, P. Benda, A. Reiter & M. Uhrin. – **Russia**: 1 ind. (ZMMU 96545 [S+A]), nr. Vladikavkaz, end of summer 1914, leg. L. Bëma (paratype of *Plecotus auritus macrobullaris* Kuzjakin, 1965). – **Turkey**: 1 f (NMP 47911 [S+A]), Van, 28 July 1992, leg. P. Benda.

Plecotus christii Gray, 1838 (incl. *P.* cf. *christii*)

Egypt: 1 m (NMP 90119 [S+B]), Bir Kohila, Qattar Mts, 4 June 1984, leg. D. Osborn; – 1 m (NMP 90118 [S+B]), Bir Nagat, Qattar Mts, 4 June 1984, leg. D. Osborn; – 1 ind. (BMNH 66a [B]), North Africa [= Nile Valley between Qena and Aswan], leg. T. Christie (lectotype of *Plecotus christii* Gray, 1838); – 1 f (BMNH 1936.2.10.18. [S+A]), Siwa Oasis, leg. O. Cooper; – 1 m (IVB 100 [S+B]), Thebes, Valley of the Kings, 30 April 1969, leg. J. Gaisler; – 1 m (BMNH 92.9.9.18 [S+A]), Pyramids of Giza, leg. J. Anderson; – 1 f (BMNH 3.12.8.5. [S+A]), Tor, Sinai, leg. J. Anderson; – 1 m (TAU M.7160 [S+B]), Um-Hashiba, Sinai, 1 December 1977. – **Israel**: 1 f (TAU M.7541 [S+B]), Amudai Amram, nr. Elat, 19 February 1981; – 1 m (TAU M.6863 [S+B]), Avdat, 17 May 1976; – 1 ind. (TAU M.1343 [S+B]), Eilath, 27 September 1954; – 1 f (TAU M.771 [S+B]), Elat, 2 March 1951; – 1 f (TAU M.8455 [S+B]), 20 km N of Elat, 17 November 1988; – 1 ind. (TAU M.9364 [S+mummy]), NE of Elat, 14 May 1995; – 1 m, 1 f (TAU M.8583, M.8584 [S+B]), Neot Hakikar, 2 May and 14 June 1989. – **Jordan**: 2 m (NMP JOR3, JOR4 [S+A]), Wadi Rum, 25 October 2004, leg. R. Lučan. – **Libya**: 1 m, 1 f (NMP 49862, 49863 [S+A]), Al Jaghbub, 13 May 2002, leg. M. Andreas, P. Benda, V. Hanák, A. Reiter & M. Uhrin.

Plecotus '*teneriffae*' *kolombatovici* Đulić, 1980

Croatia: 1 m (NMP 49092 [S+B]), Hvar Island, Stari Grad, 1 September 1977, leg. J. Červený & B. Kryštufek; – 1 m (NMP 49091 [S+B]), Zavala, Belušica pečina Cave, 29 August 1977, leg. J. Červený & B. Kryštufek. – **Cyprus**: 1 f (NMP 91268 [S+A]), Agirdağ, 5 April 2005, leg. I. Horáček, P. Hulva & R. Lučan; – 1 m (NMP 90398 [S+A]), Akamas Pen., Smigies Trail, mine, 9 April 2005, leg. P. Benda & V. Hanák; – 3 m, 7 f (NMP 90903–90908, 90910, 90911 [S+A], 90909, 90912 [A]), Troodos Forest, 2 km S of Troodos, 22 July 2006, leg. P. Benda; – 1 m, 1 f (NMP 91223, 91224 [S+A]), Troodos Forest, 3 km W of Troodos, mine, 14 October 2005, leg. I. Horáček, P. Hulva & R. Lučan; – 2 f (NMP 91209, 91228 [S+A]), Troodos Forest, 4.5 km SW of Kakopetria, 13 and 14 October 2005, leg. I. Horáček, P. Hulva & R. Lučan. – **Greece**: 1 m (ZFMK 97.214 [S+B]), Corfu Island, Lefkimmi, Kritika, 27 March 1961, leg. J. Niethammer; – 1 m (NMP 48569 [S]), Delphi, 23 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m (SMF 44918 [S+B]), Hios Island, Agia Fotia, 23 May 1972, leg. D. Kock; – 1 m (NMP 48585 [S+B]), Kleidonia, Voidomatis river, 27 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 3 m, 1 f (NMP 48725–48728 [S+A]), Kombotades, nr. Lamia, 9 and 10 September 1996, leg. M. Andreas, P. Benda & M. Uhrin; – 1 f (NMP 48572 [S+B]), Micro Pappigo, pool, 25 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 4 m (NMP 48573–48575 [S+B], 48576 [S]), Pappigo, Tymphi Mts, cave, 26 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík. – **Turkey**: 1 m (NMP 48087 [S+B]), Çevlik, ancient ruins, 1 July 1997, leg. P. Benda; – 1 f (JGUM unnumbered [S]), Karadere, Letoon, ruins, February 1999, leg. A. Kiefer; – 2 m, 1 f (CUP T93/73–75 [S+A]), Yalan Dünya Mağara Cave, 30 October 1993, leg. P. Benda & I. Horáček.

Miniopterus schreibersii (Kuhl, 1817)

Algeria: 20 m, 13 f (MUB A2–A12, A33–A35, A51, A52, A98, A175–A177, A179, A249, A268, A290–A294, A296, A332, A349, A386 [S+B]), Bejaïa, Aokas, 30 April, 21 May, 1 October, 10 December 1981, 14 May, 20 June, 7 and 28 October 1982, 7 January 1983, leg. J. Gaisler; – 1 f (MUB A486 [S+B]), Misserghin nr. Oran, 14 July 1983, leg. J. Gaisler; – 2 f (MUB A114, A115 [S+B]), Sig, 6 October 1981, leg. K. Kowalski & B. Rzebik-Kowalska; – 1 m (MUB A160 [S+B]), Tiddis nr. Constantine, 20 November 1981, leg. J. Gaisler. – **Bulgaria**: 1 m (NMP 49806 [S+A]), Bačkovo, Marciganica hut, 23 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 1 f (NMP 40690 [S+B]), Beloslav, 4 September 1966, leg. B. Pražan; – 1 m (IVB 12 [S+B]), Beloslav, Temnata dupka Cave, 9 September 1962, leg. J. Gaisler; – 1 m, 6 f (NMP 50258–50261 [A], 49647–49649 [S+A]), Devenci, Hajduška dupka Cave, 7 July 1975, 14 June 1977, leg. V. Bejček, J. Červený, J. Škopek, P. Vašák & V. Vohralík; – 2 f (NMP 50049, 50050 [S+A]), Kamen Briag, 12 July 1986, leg. V. Hanzal, K. Hůrka, P. Musil, M. Průcha, M. Šálek, V. Vohralík & K. Weidinger; – 1 m, 5 f (NMP 49351 [S], 49356, 49357, 49361, 49362, 49367 [S+A]), Karlukovo, 3, 5 and 6 July 1976, leg. M. Braniš, V. Hanák, I. Horáček, K. Hůrka, J. Jirouš, V. Švihla & V. Vohralík; – 2 m, 5 f (NMP 50238–50244 [A]), Karlukovo, Čerdženica peštera Cave, 6 July 1975, leg. J. Červený; – 1 m, 1 f (NMP 49798, 49799 [S+A]), Kotel, Nirica peštera Cave, 15 July 1979, leg. D. Holečková, P. Donát, I. Horáček, J. Jirouš & V. Vohralík; – 1 m, 1 f (IVB 19, 41, NMP 50143 [S+B]), Lakatnik, Suhata peštera Cave, 21 December 1956, 10 February 1965, leg. V. Beškov, J. Figala, J. Gaisler, V. Hanák & K. Hůrka; – 1 m (NMP 50203 [A]), Mladežko, 11 July 1958, leg. K. Hůrka; – 2 m, 4 f (NMP 50040, 50058–50062 [S+A]), Mostovo, 22 August 1987, leg. P. Musil & V. Vohralík; – 2 m (IVB 45, 46 [S+B]), Peštera, Ušatovi dupki Cave, 8 August 1967, leg. J. Gaisler; – 14 m, 24 f, 1 ind. (NMP 49186, 49191, 49192, 49198, 49205–49207, 49214, 49220, 49222, 49226–49229, 49231, 49232, 49341 [S+A], 49686–49703, 80/66 [S+B], 50198, 50199, 50201, 50202 [A], 49197 [S]), Primorsko, Maslen Nos, cave, 5 June 1957, 27 August 1961, 5 August 1966, leg. V. Hanák, B. Král & P. Pithart; – 2 f (NMP 40925 [S+B], 40926 [S]), Sliven, 10 and 19 June 1982, leg. D. Frynta, D. Holečková, I. Horáček, H. Prágerová & V. Vohralík; – 4 m, 9 f (NMP 49148, 49165, 49166, 49177–49181 [S+A], 49150–49152, 49162 [S+B], 50191 [A]), Sliven, Zmejovi dupki Cave, 25 and 27 May 1957, leg. V. Hanák. – **Cyprus**: 3 m, 5 f (NMP 91253–91260 [S+A]), Akamas Pen., Smigies Trail, mines, 27 March 2005, leg. I. Horáček, P. Hulva & R. Lučan; – 1 m (NMP 90434 [S+A]), 3 km NW of Kalavasos, mine, 19 April 2005, leg. P. Benda & V. Hanák; – 8 m (NMP 90404–90406, 91266, 91267 [S+A], 90402, 90403, 91265 [A]), Troodos Forest, 4 km SW of Kakopetria, mine, 29 March and 11 April 2005, leg. P. Benda, I. Horáček, P. Hulva & R. Lučan. – **Greece**: 1 m (NMP 48657 [S+B]), 2 km S of Avas, 20 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 m, 2 f (NMP 48665–48667 [S+B]), Didimotiho, cave, 22 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 2 m, 2 f (NMP 48622–48625 [S+B]), Kimmeria, mine, 16 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 1 m, 2 f (NMP 48632, 48633, 48642 [S+B]), 3 km SW of Maronia, Cave of the Cyclops Polyphemos, 18 and 19 June 1989, leg. R. Chaloupka, V. Hanák & V. Vohralík; – 2 f (NMP 48578, 48579 [S]), Pappigo, 26 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík; – 1 m, 1 f (NMP 48610, 48611 [S+B]), Petralona, 28 September 1988, leg. V. Hanák, Z. Roček & V. Vohralík. – **Iran**: 2 m, 1 f (NMP 48149–48151 [S+A]), Bisotun, 8 October 1998, leg. M. Andreas & A. Reiter; – 1 m (NMP 48154 [S+A]), Dorud, 9 October 1998, leg. P. Benda & M. Uhrin; – 7 m (NMP 90825–90831 [S+A]), 5 km S of Mina, 22 May 2006, leg. P. Benda & A. Reiter. – **Italy**: 1 m, 2 f, 1 ind. (ZFMK 66.357–66.360 [S+B]), Vico del Gargano, 4 August 1961, leg. G. Witte. – **Lebanon**: 10 m, 6 f (AUB M123–M128, M132–M135, M139, M142, M1162–M1165 [S+B]), cave 2 km E Amchite, cave 2 km E Amchite, 18 March 1961, 17 April 1965, leg. S. Atallah & R. E. Lewis. – **Morocco**: 1 f (NMP 90103 [S+A]), Sebt-des-Ait-Serhrou, 9 September 2003, leg. P. Benda; – 6 m, 4 f (NMP 90046–90055 [S+A]), Talkout, Oued Tessaout, 30 August 2003, leg. P. Benda. – **Slovakia**: 2 m, 2 f (SNM 421, 426–428 [S+B]), Drienčany, Veľká Drienčanská Cave, 30 April and 16 October 1954, leg. J. Vachold; – 3 m, 5 m (NMP 150/58, 155/58, 156/58, 570/59, 613/59, 246/61, SNM 744, 745 [S+B]), Drienovec, Drienovská Cave, October 1955, 6 February 1958, 31 May 1959, 1 June 1959, 17 February 1961, leg. V. Hanák & J. Vachold; – 11 m, 15 f, 8 inds. (NMP J114, J117, J118, J123, J140, J174, J176–J178, J180, J181, 70/58, 76/58, 85/58, 89/58, 92–94/58, 96/58, 99/58, 100/58, unnumbered, SNM 460–463, 465 [S+B]), Domica, Čertova diera Cave, 14, 16 and 21 September 1949, 10 December 1956, 5 February 1958, leg. V. Hanák & J. Vachold; – 3 f (SNM 466, 743, 746 [S+B]), Jasov, Jasovská Cave, 22 September 1949, 1 February and 1 July 1957, leg. J. Vachold. – **Spain**: 4 m, 3 f (ZFMK 56.733–56.738, 56.1068 [S+B]), Pyrenees nr. Tremp, 28 May 1955, leg. J. Niethammer; – 1 m (ZFMK 97.246 [S+B]), Ramales de la Victoria, 43° 15' N, 03° 28' E, 19 April 1963, leg. J. Niethammer. – **Turkey**: 6 m, 1 f (ZFMK 66.619, 66.625–66.630 [S]), Burdur, Insuyu Cave, 11 and 20 April 1966, leg. K. Dobat; – 2 m, 1 f (CUP T93/57–59 [S+A]), Çayirkoyi Mağara Cave, 20 October 1993, leg. P. Benda & I. Horáček; – 1 m, 1 f (ZFMK 58.282, 58.283 [S+mummy]), Haruniye, 1953, leg. H. Kumerloeve; –4 m, 4 f (CUP T93/16–22, T93/44 [S+A]), Sarpdere, Dupnisa Mağara Cave, 16 and 17 October 1993, leg. P. Benda & I. Horáček; – 1 f (CUP T93/04 [S+A]), Velika Köprüsü, 15 October 1993, leg. P. Benda & I. Horáček. – **Yemen**: 5 m, 2 f (NMP pb3126–pb3132 [S+A]), Jebel Bura, W of Riqab, 30 October 2005, leg. P. Benda.

Tadarida teniotis **(Rafinesque, 1814)**

Algeria: 6 f (ISEA 9596, 9597, 9599, MUB A514, A515 [S+B], ISEA 9598 [S]), Amentane, Aurès, 8 August 1983, leg. J. Gaisler, K. Kowalski & B. Rzebik-Kowalska. – **Azerbaijan**: 1 m (MUB 1.2.38 [S+B]), Nagornyj Karabah Republic, Šušinskoe Canyon, 17 August 1939, leg. A. Kuzjakin. – **France**: 1 f (ZFMK 59.351 [B]), Le Trayas, Riviera, 19 October 1956, leg. B. Issel & W. Issel; – 1 ind. (SMF 33562 [S]), Southern France, 30 Remoulin, Pont du Gard, 30 August 1963. – **Iran**: 1 m (NMP 90833 [S+A]), 10 km NW of Emam Qoli, 24 May 2006, leg. P. Benda & A. Reiter; – 1 f (NMP 90811 [S+A]), 5 km W of Amir Abad, 21 May 2006, leg. P. Benda & A. Reiter; – 1 m (NMP 48458 [S+A]), Firuz Abad, 21 April 2000, leg. P. Benda & A. Reiter; – 3 m, 3 f (NMP 48449–48454 [S+A]), Khoshangan, 19 April 2000, leg. P. Benda & A. Reiter; – 2 f (NMP 90797, 90798 [S+A]), Shurlaq, 18 May 2006, leg. P. Benda & A. Reiter. – **Morocco**: 1 m (NMP 90078 [S+A]), Tamtattouchte, 3 November 2003, leg. P. Benda. – **Turkey**: 5 f (ZFMK 64.699–64.702, ZFMK 72.141 [S+B]), Birecik, 26 May 1964, 11 May 1972, leg. H. Kumerloeve & U. Hirsch.

APPENDIX III

Biometric data on the bats from Syria

Basic external and cranial measurements of the examined bat specimens collected in Syria (both the Syria *sensu lato* and *sensu stricto*, see Material and Methods). For collection and measurement abbreviations see pp. 10, 11. In alphabetical and numerical orders, according to collection acronyms and numbers.

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb/c	LaZ	LaI	LaN	AN	CC	M^3M^3	$CM^{2/3}$	LMd	ACo	CM_3
Rousettus aegyptiacus																					
NMP 48264	Ya'ar Oden	m	a	152	21	93.7	22.2	–	100	44.18	42.50	27.02	7.57	17.42	13.72	8.93	13.37	17.62	34.58	15.02	19.20
NMP 48265	Ya'ar Oden	f	L	139	21	92.9	21.1	–	100	43.58	41.22	26.40	7.30	17.30	12.95	8.82	13.21	15.56	33.56	–	17.75
NMP 48865	Talsh'hab	m	a	143	14	92.7	21.4	–	107	42.43	40.75	25.77	8.59	17.02	12.55	8.47	12.29	16.35	33.55	15.03	17.95
NMP 48866	Talsh'hab	f	L	137	22	97.5	23.0	–	102	43.32	41.72	26.36	8.40	16.84	12.82	8.43	12.72	16.18	33.63	14.49	18.09
NMP 48867	Talsh'hab	f	s	132	19	88.7	21.4	–	96.5	40.18	38.28	23.38	7.55	15.75	12.32	8.12	11.84	15.24	31.14	12.95	16.92
Rhinopoma hardwickii																					
NMP 48268	Q. Nimrud	m	s	67	70	56.8	20.1	7.8	11.0	17.87	15.87	10.47	2.85	7.38	5.38	4.32	8.17	6.13	12.14	4.67	6.54
NMP 48269	Q. Nimrud	m	s	62	65	57.6	18.5	7.2	11.1	–	–	10.48	2.35	7.34	–	4.40	8.20	6.38	12.31	4.78	6.78
Taphozous nudiventris																					
CUP [unnumb.]	Halabiyyeh	f	G	107	38	80.1	29.0	6.5	72.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48015	Halabiyyeh	f	G	103	36	79.5	23.2	6.5	81.5	28.62	25.42	17.02	5.13	12.07	9.56	6.92	11.85	12.25	21.75	7.95	13.88
NMP 48016	Halabiyyeh	f	G	102	34	79.2	21.3	6.6	77.0	29.60	26.15	17.12	5.47	12.17	9.33	6.53	11.66	12.17	21.82	8.38	13.60
NMP 48017	Halabiyyeh	f	G	108	35	80.9	20.5	6.0	83.0	29.75	26.34	17.58	5.12	11.97	9.62	6.88	11.77	11.78	21.68	8.31	13.23
NMP 48018	Halabiyyeh	f	a	99	37	79.1	23.5	6.1	53.0	27.92	25.90	17.54	5.18	11.92	9.28	6.77	11.98	12.40	21.89	8.17	14.08
NMP 48793	Halabiyyeh	f	G	102	34	77.3	24.1	6.8	83.0	29.20	25.53	16.99	5.32	12.84	9.67	6.61	11.33	11.84	21.52	8.06	13.23
NMP 48794	Halabiyyeh	f	G	102	34	79.8	23.5	6.3	78.0	30.05	26.18	17.87	5.49	13.02	10.02	6.85	11.71	12.22	22.24	8.55	13.67
NMP 48795	Halabiyyeh	f	G	98	36	81.1	23.2	7.0	69.5	29.88	26.07	17.59	5.47	11.73	9.82	6.73	11.53	12.07	21.93	8.30	13.65
NMP 48796	Halabiyyeh	f	G	107	36	78.7	22.9	6.8	76.0	29.51	25.76	17.32	5.32	12.38	10.11	6.77	11.75	12.40	21.55	8.17	13.87
NMP 48797	Halabiyyeh	f	G	100	34	79.2	23.4	6.8	81.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48798	Halabiyyeh	f	G	103	33	79.1	23.4	6.3	69.5	29.23	25.92	17.27	5.27	12.29	10.40	6.68	11.84	12.32	22.18	8.32	13.70
NMP 48799	Halabiyyeh	m	j	95	34	77.2	21.4	6.2	43.0	25.79	25.37	16.53	5.02	12.07	8.18	6.47	11.13	12.17	22.11	8.33	13.66
NMP 48822	Khazneh	f	a	100	39	79.7	24.0	6.8	57.5	27.73	26.40	–	5.23	12.52	8.64	6.92	11.71	12.55	22.69	8.22	14.37
NMP 48823	Khazneh	f	G	103	39	78.5	23.8	6.9	67.5	28.80	25.74	17.17	5.23	11.95	8.88	6.62	11.58	12.28	21.75	8.36	13.67
NMP 48826	Ayyash	f	G	101	35	81.1	23.5	6.6	66.8	28.98	25.17	17.67	4.88	12.33	10.00	6.71	11.76	12.07	21.69	8.32	13.47
SMF 74084	Halabiyyeh	m	a	99	33	80.3	27.2	–	–	28.20	26.50	16.90	5.10	12.30	–	6.40	11.70	12.40	22.40	–	13.90
SMF 74085	Halabiyyeh	f	G	107	31	77.5	26.6	–	–	28.60	26.10	17.63	5.10	12.20	–	6.60	11.60	12.00	21.90	–	13.40
SMF 74086	Halabiyyeh	f	G	108	32	80.2	28.6	–	–	29.70	26.20	17.90	5.30	12.55	–	6.80	11.80	12.10	22.40	–	13.60
Rhinolophus ferrumequinum																					
MNHN 1983-1958	Lattaquie	m	–	–	–	–	–	–	–	23.35	20.57	12.30	2.41	9.62	7.12	6.55	8.97	9.12	16.10	4.22	8.75
NMP 48030	Dura Europos	m	a	66	40	56.5	24.5		13.0	22.62	19.75	11.40	2.47	9.05	6.36	5.96	8.17	8.23	14.90	3.62	8.92
NMP 48073	Q. Salah Din	m	a	72	38	57.0	20.2		17.2	24.26	21.23	12.47	2.50	9.44	7.08	6.58	8.75	8.89	16.17	3.73	9.56
NMP 48074	Q. Salah Din	f	s	70	40	57.7	22.8		15.0	23.55	20.43	11.95	2.56	9.38	6.98	6.70	8.49	8.62	15.67	4.00	9.28
NMP 48077	Q. Sheisar	f	a	76	45	59.8	24.6		21.5	24.44	21.08	12.53	2.33	9.28	6.98	6.63	8.76	8.75	16.09	4.08	9.45
NMP 48078	Q. Sheisar	f	a	71	45	58.9	24.9		20.0	24.16	21.10	12.07	2.20	9.17	6.93	6.73	8.66	8.83	16.07	4.13	9.46
NMP 48079	Q. Sheisar	f	a	73	39	60.8	24.4		20.5	24.08	20.79	12.08	2.49	9.52	7.02	6.63	8.62	8.82	15.63	3.92	9.47
NMP 48080	Q. Sheisar	f	a	75	44	59.5	25.9		20.3	23.44	20.57	12.50	2.88	9.45	7.50	6.75	8.75	8.58	15.92	4.32	9.28
NMP 48081	Q. Sheisar	f	a	75	39	58.9	23.4		21.0	24.05	20.91	12.51	2.42	9.40	6.98	6.54	8.82	8.81	15.88	4.05	9.60
NMP 48082	Q. Sheisar	f	a	70	42	61.2	24.2		21.2	23.85	20.71	12.60	2.43	9.78	7.57	6.74	8.74	8.75	15.88	4.33	9.46
NMP 48083	Q. Sheisar	f	j	53	35	43.0	21.6		10.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48270	Q. Nimrud	m	a	78	46	58.2	24.2		21.5	23.95	20.37	–	2.62	9.39	7.07	6.68	8.63	8.86	16.02	4.12	9.56
NMP 48759	Q. Najm	f	G	71	38	57.8	23.6		21.3	23.08	20.13	11.92	2.62	9.41	6.67	6.03	8.45	8.42	15.60	3.78	9.11
NMP 48760	Q. Najm	m	a	71	39	57.4	24.9		19.1	23.08	19.82	11.92	2.64	9.08	6.58	6.38	8.47	8.30	15.18	3.88	8.82

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCc	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Rhinolophus ferrumequinum																					
NMP 48761	Q. Najm	f	G	68	33	58.0	24.2		24.1	22.64	20.12	11.41	2.53	9.17	6.44	6.34	8.55	8.43	15.12	3.67	8.92
NMP 48762	Q. Najm	f	G	72	41	58.4	23.8		28.0	22.79	19.92	11.65	2.30	9.03	6.81	6.19	8.18	8.08	15.08	3.73	8.57
NMP 48763	Q. Najm	f	G	71	36	59.1	25.8		25.0	23.62	20.54	11.87	2.59	9.47	–	6.42	8.58	8.67	15.66	4.22	9.22
NMP 48764	Q. Najm	f	G	71	45	58.8	22.8		20.4	23.36	20.04	11.61	2.41	9.18	7.07	6.12	8.27	8.36	15.32	4.18	9.04
NMP 48804	Dura Europos	m	a	66	38	53.6	23.5		15.0	22.75	19.52	11.22	2.28	8.93	6.37	6.17	8.29	8.34	14.59	3.63	8.92
NMP 48854	Bosra	f	G	76	41	57.1	24.4		27.5	23.58	20.82	12.45	2.32	9.02	6.93	6.72	8.49	8.77	16.02	4.07	9.42
NMP 48855	Bosra	f	G	71	39	60.0	24.2		29.2	24.16	20.88	12.58	2.45	9.22	7.40	6.75	8.95	8.97	16.44	4.07	9.65
NMP 48856	Bosra	f	p	71	38	59.1	24.7		22.5	24.02	20.78	12.42	2.57	9.71	7.37	6.64	8.58	8.73	16.08	4.12	9.45
NMP 48857	Bosra	f	G	72	44	60.1	23.8		26.0	24.54	21.08	12.62	2.44	9.30	7.31	6.94	8.98	8.88	16.30	4.18	9.64
NMP 48858	Bosra	f	G	75	39	59.1	24.2		31.7	24.89	21.39	12.50	2.42	9.32	7.26	7.02	9.08	9.13	16.53	4.27	9.84
NMP 48859	Bosra	m	j	44	16	25.7	14.5		5.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48892	Q.Sheisar	f	a	70	–	59.7	–		–	23.81	20.63	12.02	2.48	9.34	7.17	6.28	8.55	8.58	15.74	4.11	9.24
NMP 48927	Qatura	m	a	73	37	57.1	23.0		34.9	24.40	21.02	12.19	2.68	9.20	7.02	6.30	8.65	8.75	16.15	4.07	9.27
NMP 48928	Qatura	f	s	70	33	55.7	25.9		17.2	23.10	19.98	11.47	2.57	9.13	6.62	6.62	8.42	8.67	15.28	3.82	9.32
NMP 48935	Q. Samaan	f	s	70	43	57.8	24.4		20.5	23.71	20.62	12.19	2.27	9.28	6.84	6.57	8.52	8.59	15.83	4.25	9.21
NMP 48936	Q. Samaan	f	s	68	37	57.9	24.8		19.5	23.83	20.68	11.87	2.28	9.29	6.82	6.55	8.68	9.03	15.86	4.04	9.62
NMP 48937	Q. Samaan	f	L	71	41	59.8	24.5		22.0	23.60	20.55	11.84	2.32	9.02	6.75	6.55	8.55	8.74	15.68	3.97	9.40
NMP 48938	Q. Samaan	m	j	51	22	36.0	16.6		9.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48974	Dura Europos	m	a	62	36	52.8	19.4		13.5	22.68	19.20	11.62	2.68	9.18	6.86	6.02	8.10	8.09	14.57	3.57	8.61
NMP 48975	Dura Europos	m	s	61	35	53.4	21.1		14.0	22.18	19.12	11.07	2.47	8.85	6.38	6.15	8.29	8.27	14.68	3.51	8.98
NMP 48976	Dura Europos	f	G	65	36	54.3	22.6		19.0	22.87	19.41	11.01	2.27	8.89	6.58	5.95	8.22	8.36	14.82	3.57	8.88
NMP 48977	Dura Europos	f	a	66	32	54.8	20.0		16.0	22.42	19.37	11.20	2.48	9.17	6.54	6.34	8.00	8.27	14.68	3.72	8.61
NMP 48978	Dura Europos	f	a	63	36	54.3	19.8		13.0	22.18	19.09	11.23	2.79	8.89	6.48	6.13	8.42	8.08	14.85	3.51	8.73
Rhinolophus hipposideros																					
NMP 48054	Q. Hosn	f	L	42	28	38.6	16.4		5.1	15.93	13.48	7.48	1.58	6.45	4.73	3.47	5.35	5.27	9.67	1.75	5.47
NMP 48055	Q. Hosn	f	j	43	28	35.5	15.2		3.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48056	Q. Hosn	f	j	30	17	15.3	6.7		1.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48979	Qanawat	f	a	42	23	37.4	14.5		4.5	15.54	13.38	7.32	1.62	6.37	4.48	3.30	5.17	5.25	9.55	2.02	5.36
Rhinolophus euryale																					
NMP 49985	Q. Hosn	f	a	–	–	–	–		–	18.57	15.66	9.21	2.18	8.22	5.84	4.41	6.55	6.12	11.17	2.38	6.37
NMP 90343	Q. Salah Din	–	–	–	–	47.2	–		–	–	–	–	–	–	–	–	–	–	–	–	–
Rhinolophus mehelyi																					
NMW 21976	Halab	m	s	55	24	48.4	21.9		12.5	19.68	16.82	10.52	2.37	8.38	–	–	–	6.65	12.40	–	7.20
NMW 21977	Halab	f	s	50	24	50.0	20.8		10.5	19.83	17.07	10.32	2.52	8.55	–	–	–	6.80	12.45	–	7.18
NMW 21978	Halab	m	s	54	25	49.4	20.2		11.5	–	17.15	10.47	2.20	8.63	–	–	–	6.83	12.48	–	7.28
NMW 21979	Halab	m	s	53	24	49.6	21.8		13.0	–	17.10	10.33	2.40	8.58	–	–	–	6.92	12.73	–	7.28
NMW 21980	Halab	m	a	53	23	48.5	19.5		11.5	20.27	17.32	10.43	2.23	8.52	–	–	–	6.93	12.58	–	7.50
NMW 21981	Halab	m	a	53	25	49.9	22.1		10.5	–	17.05	10.27	2.53	8.55	–	–	–	6.85	12.63	–	7.22
NMW 21982	Halab	f	a	55	25	50.3	22.3		10.5	19.97	17.02	10.40	2.35	8.18	–	–	–	6.87	12.60	–	7.37
NMW 21983	Halab	f	s	53	26	48.7	21.8		10.0	–	16.92	10.07	2.40	8.18	–	–	–	6.65	12.27	–	7.12
NMW 21984	Halab	f	a	54	27	50.2	22.5		10.5	19.88	17.07	10.57	2.52	8.47	–	–	–	6.77	12.63	–	7.25
NMW 21985	Halab	f	s	50	23	48.1	22.0		9.5	19.40	16.72	10.20	2.42	8.42	–	–	–	6.62	12.25	–	7.15

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCc	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Rhinolophus mehelyi																					
NMW 21986	Halab	f	a	54	25	50.1	22.8		10.0	19.78	17.00	10.32	2.40	8.53	–	–	–	6.63	12.55	–	7.07
NMW 21987	Halab	f	a	55	26	50.0	22.8		11.0	19.85	17.18	10.33	2.53	8.25	–	–	–	6.83	12.60	–	7.28
NMW 21988	Halab	m	a	52	25	48.3	22.9		10.0	20.02	17.00	10.35	2.47	8.55	–	–	–	6.90	12.70	–	7.45
NMW 21989	Halab	m	a	56	24	49.3	20.5		14.0	–	17.20	10.65	2.47	8.82	–	–	–	6.82	12.62	–	7.25
NMW 21990	Halab	m	a	54	25	49.4	20.2		15.0	–		10.32	2.47	8.55	–	–	–	6.95	12.42	–	7.38
NMW 21991	Halab	f	a	54	25	50.1	22.6		17.0	–	17.37	10.37	2.62	8.72	–	–	–	6.87	12.83	–	7.35
NMW 21992	Halab	m	a	59	27	51.1	23.0		13.5	–	17.23	10.67	2.55	8.82	–	–	–	6.82	12.83	–	7.22
Rhinolophus blasii																					
NMW 21962	Halab	m	s	55	26	47.5	20.3		9.5	–	16.95	9.30	2.30	8.27	6.17	4.58	6.37	6.81	12.08	2.67	7.13
NMW 21963	Halab	m	a	53	27	48.2	18.5		9.5	20.10	17.00	9.27	2.38	8.27	6.12	4.60	6.45	6.85	12.15	2.67	7.12
NMW 21964	Halab	m	a	51	26	46.8	18.2		9.5	19.60	16.75	9.15	2.43	8.11	6.27	4.63	6.58	6.95	11.97	2.70	7.23
NMW 21965	Halab	m	s	52	22	46.7	19.6		9.5	–	17.02	9.33	2.31	8.21	6.15	4.52	6.53	6.87	12.10	2.85	7.20
NMW 21966	Halab	m	s	53	26	47.2	18.2		9.5	19.65	17.02	9.22	2.32	8.35	6.20	4.60	6.68	6.87	12.20	2.72	7.18
NMW 21967	Halab	f	s	50	25	48.4	18.0		8.0	19.70	16.87	9.32	2.42	8.27	5.97	4.47	6.57	6.92	12.07	2.65	7.35
NMW 21968	Halab	m	s	50	25	47.7	17.3		7.0	19.17	16.13	9.05	2.25	8.02	6.02	4.48	6.32	6.65	11.70	2.55	7.07
NMW 21969	Halab	f	a	48	23	48.6	18.6		8.0	20.00	17.15	9.25	2.47	8.18	6.02	4.68	6.62	6.88	12.25	2.65	7.40
NMW 21970	Halab	m	s	55	26	46.5	18.5		9.0	19.87	16.82	9.55	2.35	8.60	6.33	4.67	6.70	6.77	11.93	2.77	7.12
NMW 21971	Halab	m	a	52	26	49.1	18.2		9.0	19.80	17.18	9.23	2.27	8.13	5.82	4.57	6.45	6.85	12.15	2.55	7.20
NMW 21972	Halab	m	a	50	23	48.7	19.0		8.5	–	16.72	9.32	2.27	8.38	6.35	4.60	6.65	6.73	11.73	2.58	6.95
NMW 21973	Halab	f	a	49	24	45.0	19.0		8.0	19.55	16.53	9.27	2.33	8.25	6.20	4.60	6.52	6.60	11.92	2.75	7.02
NMW 21974	Halab	m	a	51	24	48.0	19.2		8.5	19.82	16.92	9.33	2.18	8.42	6.12	4.48	6.57	6.82	11.85	2.63	7.08
NMW 21975	Halab	m	s	50	24	44.8	19.1		8.5	19.95	16.98	9.10	2.12	8.22	5.97	4.53	6.65	7.00	12.23	2.73	7.30
ZFMK 79.627	Syria	m	a	–	–	47.0	–		7.4	19.03	16.62	8.98	2.34	8.27	5.94	4.37	6.36	6.77	11.92	2.72	7.08
Asellia tridens																					
NMP 47926	Tadmor	f	–	–	–	50.7	17.7		12.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48019	Halabiyyeh	f	G	65	20	53.6	18.8		13.8	19.45	16.90	10.46	2.47	7.67	5.58	5.35	7.58	6.73	12.96	3.98	7.42
NMP 48020	Halabiyyeh	f	G	60	27	52.0	18.1		12.8	18.76	16.32	10.10	2.47	7.60	5.28	5.08	7.38	6.86	12.17	3.98	7.38
NMP 48021	Halabiyyeh	f	G	59	23	50.9	18.5		11.5	18.60	16.47	10.32	2.25	7.62	5.62	5.29	7.42	6.83	12.42	3.87	7.37
NMP 48022	Halabiyyeh	f	s	59	23	52.2	18.3		9.2	19.24	16.88	10.77	2.34	7.72	5.55	5.34	7.65	7.02	12.87	4.18	7.57
NMP 48023	Halabiyyeh	f	G	60	26	51.1	20.0		14.5	19.38	16.82	11.02	2.36	7.63	5.74	5.43	7.77	6.97	12.95	4.22	7.60
NMP 48024	Halabiyyeh	f	G	64	29	51.4	20.3		14.0	18.95	16.82	10.69	2.35	7.85	5.33	5.17	7.42	6.73	12.62	4.16	7.32
NMP 48025	Halabiyyeh	f	G	61	27	51.3	18.2		12.5	18.22	16.13	10.41	2.47	7.47	5.75	5.08	7.68	6.64	12.24	3.87	7.11
NMP 48026	Halabiyyeh	f	a	65	28	52.1	19.8		11.2	19.19	17.18	10.78	2.35	7.53	5.43	5.41	7.53	7.00	12.87	3.97	7.63
NMP 48027	Halabiyyeh	f	G	67	23	51.4	19.9		15.2	19.18	16.66	10.73	2.57	7.92	5.73	5.32	7.73	6.73	12.82	4.17	7.42
NMP 48037	Tadmor	m	a	67	30	54.5	19.3		11.5	19.35	17.13	10.93	2.33	7.65	5.62	5.47	7.92	6.93	13.17	4.19	7.68
NMP 48038	Tadmor	m	a	65	25	51.5	16.6		11.8	19.11	16.95	10.68	2.33	7.40	5.68	5.41	7.43	6.79	12.75	3.82	7.48
NMP 48039	Tadmor	m	a	60	23	50.4	18.5		9.7	18.97	16.76	10.47	2.38	7.18	5.59	5.18	7.21	6.89	12.58	4.08	7.37
NMP 48040	Tadmor	m	a	65	24	54.3	18.5		11.8	19.23	16.88	10.70	2.30	7.44	6.03	5.41	7.47	6.89	12.83	4.24	7.46
NMP 48041	Tadmor	m	a	68	24	51.1	19.5		12.2	19.13	–	10.75	2.37	7.52	–	5.59	7.79	7.02	13.03	4.27	7.61
NMP 48042	Tadmor	m	a	66	25	53.2	19.0		10.3	19.23	16.71	10.73	2.38	7.48	5.83	5.33	7.53	6.70	12.55	4.23	7.46
NMP 48043	Tadmor	m	a	65	23	50.1	18.3		11.0	19.07	16.80	10.44	2.22	7.42	5.43	5.34	7.58	6.98	13.03	4.09	7.58
NMP 48044	Tadmor	m	a	66	28	53.4	19.2		11.8	19.15	17.07	10.92	2.25	7.70	5.40	5.69	7.65	6.84	13.00	3.97	7.62

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb/c	LaZ	LaI	LaN	AN	CC	M^{3}M^3	CM^3	LMd	ACo	CM$_3$
Asellia tridens																					
NMP 48045	Tadmor	m	a	62	25	49.0	17.6		12.1	18.76	16.41	10.76	2.56	7.27	5.57	5.26	7.42	6.73	12.46	4.05	7.53
NMP 48046	Tadmor	m	a	64	26	51.2	19.0		9.7	19.46	16.98	10.43	2.35	7.72	5.75	5.21	7.53	7.02	12.72	4.10	7.52
NMP 48047	Tadmor	m	a	67	22	54.2	20.6		11.8	19.71	17.30	10.78	2.25	7.53	5.89	5.41	7.76	6.73	13.18	4.48	7.44
NMP 48813	Q. Rahba	m	a	64	27	55.0	20.1		11.1	19.88	17.75	11.12	2.18	8.07	5.78	5.92	7.92	7.17	13.57	4.49	7.77¨
RLC SY5	Tadmor	m	–	67	13	52.3	20.6		18.5	–	–	–	–	–	–	–	–	–	–	–	–
RLC SY6	Tadmor	m	–	67	14	51.7	19.4		17.0	–	–	–	–	–	–	–	–	–	–	–	–
RLC SY7	Tadmor	m	–	66	16	53.0	19.0		16.5	–	–	–	–	–	–	–	–	–	–	–	–
Myotis myotis																					
BMNH 61.391	Q. Hosn	f	a	–	–	–	–	–	–	25.71	24.78	16.19	5.34	10.02	8.43	6.70	10.48	10.98	19.56	6.95	11.78¨
MNHN 1876-335	Lattaquie	f	–	–	–	67.7	23.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MNHN 1876-336	Lattaquie	f	–	–	–	66.3	26.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48915	Q. Marqab	m	a	83	60	64.3	27.9	14.2	32.8	25.82	24.47	16.46	5.39	10.55	8.82	6.61	10.77	11.07	19.68	7.13	11.77
NMP 48916	Q. Marqab	m	a	78	62	67.3	29.9	12.1	30.5	25.57	24.17	16.14	5.32	10.67	8.49	6.67	10.42	10.67	19.53	6.92	11.47
NMP 90289	Q. Hosn	f	a	78	52	67.0	27.2	12.6	32.5	24.58	23.57	15.56	5.02	9.59	8.19	6.27	10.14	10.56	19.04	6.60	11.41
NMW 22040	Halab	f	a	84	54	66.5	26.2	12.9	32.5	25.40	24.53	16.15	5.15	10.35	–	–	–	10.82	19.65	–	11.43
NMW 22041	Halab	f	a	86	55	68.4	25.8	13.3	36.0	25.52	24.47	16.42	5.15	10.45	–	–	–	10.97	19.65	–	11.82
NMW 22042	Halab	f	a	82	55	68.3	26.0	14.0	34.0	26.15	24.75	16.78	5.37	10.83	–	–	–	10.83	19.83	–	11.58
NMW 22043	Halab	m	a	82	51	63.6	24.8	11.8	30.0	25.08	23.98	16.27	5.13	10.17	–	–	–	10.70	19.48	–	11.52
NMW 22044	Halab	f	a	85	63	68.5	27.0	12.8	36.0	25.93	24.82	16.23	5.12	10.07	–	–	–	10.80	19.88	–	11.70
NMW 22045	Halab	m	a	85	55	67.7	25.5	12.1	37.0	25.20	24.13	16.33	5.28	10.68	–	–	–	10.75	19.53	–	11.47
NMW 22046	Halab	f	a	80	55	64.1	26.2	11.4	31.0	25.58	24.50	16.48	5.25	10.55	–	–	–	10.70	19.50	–	11.52
NMW 22047	Halab	f	a	82	58	67.6	26.0	12.0	32.5	25.67	24.63	16.25	5.17	10.38	–	–	–	11.02	20.00	–	12.12
Myotis blythii																					
BMNH 61.388	Tell Kalakh	m	a	–	–	–	–	–	–	22.06	21.14	–	5.17	10.01	7.63	5.92	8.79	9.11	16.68	5.87	9.63
BMNH 61.389	Tell Kalakh	m	a	–	–	–	–	–	–	22.31	21.44	14.48	5.07	9.88	7.84	6.03	9.34	9.68	17.48	5.58	10.21
BMNH 61.390	Tell Kalakh	f	a	–	–	–	–	–	–	22.07	20.92	14.19	4.86	9.67	7.65	5.98	9.01	9.34	17.07	5.38	9.89
MHNH 1983-1484	Djéroud	f	–	–	–	60.1	23.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MNHN 1876-335A	Lattaquie	f	–	–	–	58.6	23.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MNHN 1876-335B	Lattaquie	f	–	–	–	60.0	23.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NMP 47976	Q. Hosn	m	a	78	66	61.8	24.7	8.9	28.2	22.43	21.73	14.54	5.03	9.95	7.75	5.88	9.07	9.35	17.12	5.56	9.92
NMP 47977	Q. Hosn	m	s	74	65	60.8	23.4	11.6	26.5	22.38	21.29	–	5.53	9.78	7.98	5.66	8.95	9.37	17.12	5.71	10.08
NMP 47978	Q. Hosn	f	s	80	68	61.9	25.5	9.9	31.0	22.15	21.21	14.17	4.97	9.53	7.62	5.98	9.33	9.29	16.88	5.43	9.97
NMP 48057	Q. Hosn	m	a	76	63	58.4	24.9	10.7	26.5	22.04	–	–	5.30	9.93	–	6.10	9.20	9.23	16.97	5.48	9.68
NMP 48271	Q. Nimrud	m	a	82	57	60.5	24.2	11.1	28.2	22.14	21.25	14.56	5.33	9.67	7.52	5.82	9.27	9.36	17.16	5.47	9.97
NMP 48874	Q. Hosn	m	s	72	64	57.7	26.3	11.2	21.6	22.57	21.75	14.17	5.03	10.03	7.47	5.68	9.02	9.37	17.22	5.72	10.00
NMP 48917	Q. Marqab	m	a	76	58	57.6	24.7	10.7	22.0	21.47	20.81	14.02	5.18	9.74	7.83	5.91	9.08	8.98	16.67	5.42	9.63
NMW 21931	Camp Fuar	f	a	71	52	63.4	22.4	11.7	18.0	21.83	20.72	14.27	5.30	9.52	–	–	–	9.32	16.90	–	10.12
NMW 22048	Halab	f	G	79	59	60.6	23.5	11.2	28.0	22.65	21.53	14.55	5.17	10.20	–	–	–	9.42	17.05	–	10.07
NMW 22049	Halab	f	a	78	55	62.5	22.6	11.0	29.0	22.30	21.53	14.60	5.12	10.25	–	–	–	9.50	16.98	–	10.37
NMW 22050	Halab	f	a	77	52	61.4	23.7	10.5	25.0	22.72	21.18	14.47	5.25	10.25	–	–	–	9.75	17.25	–	10.12
NMW 22051	Halab	f	a	70	56	60.4	24.0	11.1	24.0	22.08	20.83	14.30	5.35	9.97	–	–	–	9.20	16.52	–	9.73
NMW 22052	Halab	f	a	75	50	61.4	24.0	11.0	25.0	22.35	20.95	–	5.25	10.02	–	–	–	9.28	17.05	–	10.07

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Myotis blythii																					
NMW 22053	Halab	f	a	72	57	61.2	22.0	10.0	27.0	22.60	21.43	14.68	4.90	9.93	–	–	–	9.40	17.33	–	10.25
NMW 22054	Halab	m	a	74	55	59.4	23.3	11.9	23.5	22.42	21.37	14.42	5.50	10.17	–	–	–	9.32	17.20	–	10.15
NMW 22055	Halab	f	a	74	55	58.8	22.8	11.5	23.5	21.77	20.63	14.13	5.27	9.65	–	–	–	9.12	16.57	–	9.73
Myotis nattereri																					
NMP 48049	Yabroud	m	a	50	42	39.4	17.0	9.9	5.6	15.16	14.15	–	3.46	7.68	5.40	3.83	5.88	5.97	11.12	3.22	6.44
NMP 48050	Yabroud	m	a	48	42	39.5	17.9	10.5	5.9	15.73	14.52	–	3.67	7.87	5.65	3.85	6.25	6.00	11.37	3.17	6.42
NMP 48051	Yabroud	m	j	50	42	38.5	17.9	10.5	5.4	–	–	–	3.72	7.85	5.32	3.54	5.97	5.82	11.08	3.03	6.68
NMP 48860	Talsh'hab	m	a	47	47	39.5	17.5	11.0	5.7	15.69	14.69	10.00	3.71	7.81	–	4.23	6.17	6.13	11.42	3.62	6.63
NMP 48870	Sarghaya	m	a	45	47	39.8	18.0	10.2	6.2	15.87	14.90	9.83	3.44	7.66	5.48	4.08	6.38	6.22	11.47	3.61	6.59
NMP 48909	Q. Marqab	m	–	–	–	41.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48910	Q. Marqab	f	L	47	48	40.8	18.3	10.0	7.3	–	14.63	10.18	3.56	7.83	–	4.12	6.44	6.12	11.33	3.42	6.45
NMP 48911	Q. Marqab	f	a	48	45	42.0	17.8	9.8	6.3	15.82	14.77	9.72	3.47	7.67	5.48	4.06	6.17	6.17	11.42	3.23	6.61
NMP 48912	Q. Marqab	f	L	50	47	41.3	18.0	10.7	7.2	15.75	14.71	10.08	3.52	7.69	5.68	4.10	6.48	6.13	11.45	3.43	6.61
NMP 48913	Q. Marqab	f	j	47	46	41.2	18.4	10.2	6.1	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48914	Q. Marqab	f	j	49	46	41.8	18.6	11.0	7.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 90284	Q. Salah Din	f	a	48	45	40.2	17.5	10.3	8.0	15.88	14.74	9.88	3.49	7.80	5.64	3.94	6.24	6.12	11.42	3.47	6.47
NMP 90285	Q. Salah Din	f	a	52	41	40.2	18.8	11.0	7.0	16.21	15.08	10.33	3.62	7.97	5.73	4.22	6.32	6.41	11.74	3.62	6.84
NMP 90286	Q. Salah Din	f	a	48	42	40.5	18.0	11.0	7.5	16.42	14.95	9.92	3.74	7.82	5.92	3.97	6.14	6.08	11.62	3.54	6.32
Myotis emarginatus																					
NMP 47927	Ras al Bassit	f	a	57	45	38.7	15.7	8.0	6.5	15.80	14.92	9.65	3.58	7.18	5.78	3.94	6.34	6.52	11.85	3.58	6.85
NMP 48939	Q. Samaan	f	G	50	46	40.2	16.6	6.7	12.1	15.82	14.93	9.75	3.47	7.44	5.63	4.11	6.34	6.55	11.93	3.53	6.85
NMP 48940	Q. Samaan	f	G	52	48	40.7	17.2	8.5	11.1	16.06	15.02	9.97	3.62	7.35	5.78	4.00	6.35	6.56	11.98	3.57	6.87
NMP 48941	Q. Samaan	f	G	53	43	39.4	17.2	9.0	10.8	15.80	14.87	9.48	3.47	7.31	5.62	3.86	5.92	6.51	11.75	3.35	6.83
NMP 48942	Q. Samaan	f	G	53	46	41.8	17.0	9.1	11.8	15.80	15.15	9.77	3.57	7.32	5.58	3.97	6.12	6.48	11.92	3.51	6.82
NMP 48943	Q. Samaan	f	G	52	42	40.7	16.1	8.0	11.6	15.68	14.83	9.73	3.62	7.32	5.62	4.03	6.07	6.37	11.77	3.52	6.75
NMP 48944	Q. Samaan	f	G	51	47	40.4	16.3	8.2	11.4	15.88	15.00	9.71	3.45	7.38	5.74	3.95	6.05	6.48	11.82	3.42	6.87
NMP 48945	Q. Samaan	f	s	52	45	40.0	16.6	8.1	9.3	15.93	14.87	9.87	3.48	7.58	5.64	3.83	6.23	6.58	11.84	3.53	6.96
NMP 48946	Q. Samaan	f	s	49	46	40.1	17.3	7.1	8.9	16.08	14.86	9.77	3.54	7.39	5.67	3.88	6.24	6.62	11.73	3.70	7.17
NMP 90326	Q. Salah Din	–	a	–	–	–	–	–	–	15.58	14.69	9.65	3.63	7.38	5.83	3.93	6.18	6.34	11.68	3.42	6.81
NMP 90327	Q. Salah Din	–	a	–	–	–	–	–	–	15.34	14.39	9.88	3.68	7.40	5.88	4.13	6.36	6.28	11.38	3.52	6.69
NMP 90328	Q. Salah Din	–	a	–	–	–	–	–	–	15.07	14.18	–	3.47	7.28	5.68	3.92	6.18	6.06	11.28	3.49	6.46
NMP 90329	Q. Salah Din	–	a	–	–	–	–	–	–	15.78	14.83	–	3.62	–	–	4.02	6.21	6.42	11.67	3.41	6.82
NMP 90330	Q. Salah Din	–	a	–	–	–	–	–	–	15.73	14.84	9.73	3.55	7.37	5.62	4.04	6.20	6.55	11.75	3.53	6.90
NMP 90331	Q. Salah Din	–	a	–	–	–	–	–	–	15.57	14.57	9.33	3.56	7.22	5.76	3.79	6.07	6.21	11.43	3.39	6.74
NMP 90332	Q. Salah Din	–	a	–	–	–	–	–	–	15.95	15.04	–	3.53	7.22	5.59	4.03	6.16	6.48	11.92	3.62	6.90
NMP 90333	Q. Salah Din	–	a	–	–	–	–	–	–	15.31	14.68	9.74	3.69	7.38	5.67	3.89	6.16	6.31	11.50	3.62	6.84
NMP 90334	Q. Salah Din	–	a	–	–	–	–	–	–	15.54	14.54	9.51	3.57	7.14	5.54	4.02	6.12	6.35	11.54	3.42	6.83
NMP 90335	Q. Salah Din	–	a	–	–	–	–	–	–	15.42	14.74	9.48	3.43	7.04	5.66	3.89	6.04	5.95	11.88	3.34	6.64
NMP 90336	Q. Salah Din	–	a	–	–	–	–	–	–	15.28	14.46	9.48	3.63	7.27	5.71	–	6.26	6.13	11.34	3.36	6.56
NMP 90337	Q. Salah Din	–	a	–	–	–	–	–	–	15.08	14.31	9.72	3.66	7.12	5.54	3.92	6.24	6.28	11.37	3.51	6.71
NMP 90338	Q. Salah Din	–	a	–	–	–	–	–	–	15.82	15.14	9.58	3.54	7.19	5.82	4.17	6.26	6.58	11.97	3.56	7.02
NMP 90339	Q. Salah Din	–	a	–	–	–	–	–	–	15.32	14.38	9.58	3.68	7.33	5.58	3.88	6.11	6.19	11.41	3.54	6.63

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Myotis emarginatus																					
NMP 90340	Q. Salah Din	–	a	–	–	–	–	–	–	15.51	14.61	9.74	3.66	7.31	5.62	3.93	6.02	6.02	11.57	3.62	6.51
NMP 90341	Q. Salah Din	–	a	–	–	–	–	–	–	15.48	14.81	9.57	3.29	7.03	5.50	3.96	6.07	6.24	11.73	3.70	6.72
TAU M.8427	Mt. Hermon	–	–	–	–	–	–	–	–	15.55	14.67	9.85	3.50	7.37	5.52	4.05	6.12	6.28	11.62	3.52	6.67
TAU M.9440	Mt. Hermon	f	–	–	–	39.7	–	–	–	15.25	14.55	9.52	3.52	7.18	5.47	3.99	6.25	6.25	11.33	3.32	6.73
Myotis capaccinii																					
NMP 48765	Al Ghazli	f	L	55	40	41.7	13.8	6.7	8.4	–	–	9.58	3.48	7.75	–	4.03	6.27	5.74	11.02	2.89	6.13
NMP 48806	Abu Kemal	f	s	54	41	41.8	14.6	7.1	8.1	15.30	14.42	9.32	3.57	7.76	5.62	3.92	6.07	5.84	10.87	3.01	6.13
NMW 22056	Halab	f	L	48	39	39.7	13.0	6.5	8.0	15.31	14.13	–	3.67	8.10	–	–	–	5.72	10.65	–	6.03
NMW 22057	Halab	f	L	50	38	41.1	13.4	6.9	8.5	15.62	14.25	–	3.73	8.08	–	–	–	5.65	10.82	–	6.11
NMW 22058	Halab	m	a	50	37	42.0	13.3	–	9.0	15.65	14.47	–	3.72	8.00	–	–	–	5.87	10.85	–	6.18
NMW 22059	Halab	m	a	51	35	40.8	13.9	6.2	8.5	15.25	14.12	9.43	3.68	8.02	–	–	–	5.71	10.67	–	5.90
NMW 22060	Halab	f	L	51	40	41.1	12.8	7.0	9.5	15.43	14.45	–	3.68	7.97	–	–	–	5.62	10.87	–	6.22
NMW 22061	Halab	f	a	51	43	39.9	13.3	7.1	7.5	15.07	14.02	–	3.63	7.70	–	–	–	5.67	10.55	–	6.15
NMW 22062	Halab	f	L	50	37	41.2	13.3	6.0	8.5	15.42	14.37	–	3.51	7.78	–	–	–	5.82	10.70	–	6.10
NMW 22063	Halab	f	L	52	35	40.9	14.0	6.7	8.5	15.20	14.28	9.45	3.72	7.93	–	–	–	5.68	10.68	–	6.00
NMW 22064	Halab	f	L	51	38	39.6	13.0	6.8	8.0	15.35	14.42	9.17	3.57	7.87	–	–	–	5.72	10.77	–	6.02
NMW 22065	Halab	f	L	49	36	40.3	13.4	7.0	8.0	15.02	14.15	–	3.67	7.88	–	–	–	5.67	10.68	–	6.08
NMW 22066	Halab	f	L	50	48	42.4	14.0	6.9	8.5	15.50	14.22	–	3.62	7.93	–	–	–	5.77	10.96	–	6.22
NMW 22067	Halab	f	L	51	39	41.6	14.1	6.8	8.0	15.27	14.08	–	3.72	8.02	–	–	–	5.70	10.72	–	6.08
Eptesicus serotinus																					
NMP 48058	Slinfeh	m	a	76	62	50.8	21.3	6.3	24.5	20.56	20.11	14.13	4.33	9.63	6.85	6.67	8.24	7.76	15.27	5.62	8.59
NMP 48059	Slinfeh	m	a	73	55	52.3	19.2	8.1	21.2	20.73	19.49	13.46	4.21	9.27	7.07	6.47	8.34	7.42	15.45	5.68	8.35
NMP 48875	Safita	f	L	79	61	54.4	21.4	8.0	29.2	20.85	20.22	14.56	4.34	9.48	6.92	7.11	9.26	8.28	15.95	6.15	9.07
NMP 48924	Hayalien	m	a	78	61	54.4	21.0	7.7	19.5	21.60	20.92	14.55	4.37	9.80	7.12	6.78	8.72	8.22	15.95	6.06	8.97
NMP 48925	Hayalien	m	a	72	56	50.1	19.2	8.0	17.0	19.95	19.27	13.67	4.12	9.64	6.42	6.50	8.37	7.60	14.82	5.95	8.38
NMP 48926	Hayalien	m	a	75	56	51.3	19.7	7.0	18.0	20.38	19.86	14.67	4.40	9.79	7.09	6.76	8.97	7.63	15.64	5.76	8.62
NMP 48985	Maalula	m	a	76	53	51.7	18.6	7.9	23.0	20.94	20.28	14.54	4.55	9.82	7.24	6.67	8.71	7.74	15.57	5.86	8.55
NMP 48986	Maalula	m	a	72	55	53.8	18.4	8.4	22.0	20.52	20.42	14.60	4.41	9.47	7.10	6.69	8.66	7.77	15.48	6.02	8.78
NMP 48987	Maalula	m	a	77	59	54.2	18.0	7.8	22.0	21.98	21.08	14.89	4.42	10.04	7.28	7.17	8.78	8.25	16.42	6.08	9.17
NMP 48988	Maalula	m	–	75	54	54.4	17.8	7.2	20.0	21.61	20.68	14.37	4.17	9.62	6.87	6.92	9.01	7.89	15.85	5.80	8.75
Eptesicus bottae																					
NMP 47980	Rasafah	f	L	65	52	44.6	17.4	7.6	13.0	17.11	16.67	11.45	3.76	7.77	5.73	5.31	7.22	5.96	12.33	4.24	6.62
NMP 47981	Rasafah	f	L	64	50	43.2	18.1	7.6	14.5	16.80	16.32	–	3.80	7.70	5.88	5.24	7.15	6.09	12.25	4.34	6.67
NMP 47982	Rasafah	f	L	66	48	44.4	18.4	7.8	14.1	16.95	16.45	11.40	3.92	8.44	5.97	5.19	7.19	6.18	12.32	4.35	6.73
NMP 47983	Rasafah	f	L	69	49	44.5	17.2	7.5	15.8	16.88	16.42	11.33	4.05	8.13	5.78	5.33	7.36	6.12	12.17	4.23	6.68
NMP 47984	Rasafah	f	a	66	50	44.9	17.2	7.8	13.2	17.08	16.80	11.43	3.92	8.10	5.96	5.43	7.45	6.23	12.57	4.35	6.87
NMP 47985	Rasafah	f	j	65	46	44.4	18.1	8.0	12.0	16.84	16.52	–	3.80	7.77	5.67	5.22	6.82	6.20	12.18	4.12	6.61
NMP 47986	Rasafah	f	j	62	47	44.4	16.8	7.8	10.2	16.93	16.53	–	3.90	7.64	5.48	4.75	6.97	6.02	12.18	4.04	6.35
NMP 47987	Rasafah	m	j	62	44	41.6	16.8	7.5	8.8	–	–	10.27	3.93	7.82	–	4.90	7.07	5.82	11.67	3.92	6.55
NMP 47988	Rasafah	m	j	66	46	41.5	16.5	7.2	9.5	16.33	15.73	10.67	3.74	7.97	5.57	4.70	6.83	5.74	11.36	4.11	6.42
NMP 47989	Rasafah	m	j	62	45	42.9	18.2	7.3	10.0	16.34	16.03	–	3.83	7.84	5.75	5.02	7.08	6.15	11.91	4.43	6.93
NMP 47990	Rasafah	m	j	63	46	43.0	17.5	7.2	10.3	16.45	15.83	–	3.77	7.37	5.47	4.65	6.28	5.93	11.75	3.92	6.43

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Eptesicus bottae																					
NMP 47991	Rasafah	m	j	63	40	43.1	18.0	7.5	10.0	16.57	16.13	–	3.82	7.67	5.37	4.47	6.68	6.07	11.88	4.11	6.43
NMP 47992	Rasafah	m	j	69	44	44.6	17.8	7.6	9.1	16.25	16.02	–	3.90	7.52	5.77	4.75	6.83	5.84	11.97	4.27	6.37
NMP 48031	Dura Europos	f	L	65	49	44.9	18.2	7.5	13.2	16.83	16.45	11.23	3.77	7.82	5.89	5.37	7.52	6.18	12.27	4.05	6.82
NMP 48770	Balis	m	a	62	46	41.7	13.5	16.8	7.7	16.23	15.88	10.76	4.07	7.88	5.65	4.92	7.11	6.07	11.78	4.33	6.59
NMP 48771	Rasafah	f	L	65	48	41.8	18.4	7.6	13.5	16.57	16.27	11.02	3.74	7.68	5.73	5.32	6.98	5.92	12.07	3.85	6.57
NMP 48772	Rasafah	f	L	65	51	44.1	17.4	7.5	14.5	16.59	–	11.03	3.72	7.58	5.88	5.17	6.89	5.93	12.02	4.42	6.52
NMP 48773	Rasafah	f	L	67	49	44.1	18.1	8.6	14.0	16.87	16.52	11.32	3.82	7.89	6.07	5.30	6.12	6.28	11.97	4.57	6.83
NMP 48774	Rasafah	f	L	68	52	44.2	16.7	8.3	14.2	17.08	16.66	11.57	4.03	8.04	6.08	5.48	7.36	6.20	12.68	4.44	6.84
NMP 48775	Rasafah	f	L	65	51	45.3	18.5	8.4	15.5	16.77	16.58	11.22	3.68	7.82	5.92	5.22	7.37	6.12	12.17	4.13	6.62
NMP 48776	Rasafah	f	j	53	28	35.8	14.4	6.6	7.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48777	Rasafah	m	j	50	22	30.7	13.4	6.8	6.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48778	Rasafah	m	j	51	29	34.7	14.7	7.6	6.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48779	Rasafah	m	j	49	24	30.5	12.5	5.6	5.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48780	Rasafah	m	j	55	26	34.4	15.1	6.7	6.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48781	Rasafah	f	j	48	23	27.4	12.1	5.9	5.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48782	Rasafah	f	j	42	22	22.6	11.1	5.3	3.8	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48805	Dura Europos	m	a	63	51	43.8	16.1	7.1	11.0	16.38	16.22	11.32	3.69	7.88	–	5.27	7.35	6.20	11.62	4.33	6.63
NMP 48818	Khazneh	m	a	60	39	41.1	15.8	8.5	11.2	15.88	15.62	10.52	3.64	7.75	5.72	4.88	6.97	5.98	11.53	3.97	6.28
NMP 48819	Khazneh	f	G	64	50	43.3	17.5	7.9	18.0	16.58	16.25	11.17	3.78	8.07	5.60	5.12	7.02	5.95	12.02	4.21	6.64
NMP 48960	Rasafah	f	G	63	48	45.0	16.2	7.6	15.0	17.63	17.40	11.63	3.93	8.21	6.15	5.43	7.56	6.42	12.71	4.52	7.02
NMP 48961	Rasafah	f	G	63	49	44.8	16.9	8.6	14.0	16.98	16.97	11.52	3.87	8.02	5.75	5.33	7.27	6.40	12.80	4.58	7.05
NMP 48962	Rasafah	f	G	63	52	45.5	16.4	8.8	16.0	17.08	17.02	11.55	4.12	8.11	5.88	5.60	7.25	6.10	12.53	4.28	6.70
NMP 48963	Rasafah	f	G	58	48	43.3	16.1	7.0	13.0	16.72	16.41	10.89	3.90	7.97	5.82	5.12	7.28	6.23	12.20	4.09	6.81
NMP 48964	Rasafah	f	G	64	53	47.0	17.0	8.1	16.0	17.32	17.22	11.08	3.78	7.87	5.88	5.58	7.44	6.38	12.51	4.22	6.92
NMP 48965	Rasafah	m	a	59	44	42.5	14.8	6.7	10.0	16.12	15.87	10.61	3.58	7.37	5.82	5.06	6.68	5.84	11.67	4.11	6.42
NMP 48972	Dura Europos	m	a	59	44	43.2	15.1	7.1	9.7	16.88	16.58	11.25	4.03	8.00	5.74	5.09	7.00	6.12	11.87	4.13	6.60
NMP 48973	Dura Europos	m	a	62	47	43.7	16.4	7.4	10.5	17.47	17.22	–	3.77	8.37	6.02	5.59	7.39	6.47	12.55	4.44	7.11
Eptesicus anatolicus																					
NMP 48075	Q. Sheisar	m	j	63	41	42.8	17.0	5.2	10.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48893	Q. Sheisar	f	p	67	55	48.7	19.1	7.0	16.2	17.86	17.47	12.47	4.17	8.69	6.47	5.77	7.91	6.80	13.33	4.88	7.47
NMP 48894	Q. Sheisar	m	a	65	51	49.8	16.2	7.0	14.0	17.27	16.95	12.32	3.75	8.48	6.07	5.63	7.70	6.45	12.85	4.65	7.17
NMP 48895	Q. Sheisar	m	a	63	53	47.2	17.7	6.9	14.0	17.96	17.62	12.48	3.82	8.73	6.52	5.88	7.82	6.68	13.20	4.90	7.42
NMP 48896	Q. Sheisar	f	G	70	52	49.8	17.3	6.8	23.5	18.29	17.75	12.98	4.22	8.75	6.82	5.91	8.32	6.73	13.47	4.13	7.50
NMP 48897	Q. Sheisar	f	G	66	54	47.2	18.3	7.5	19.8	18.24	17.82	12.74	3.91	8.41	6.63	6.08	8.22	6.87	13.18	4.81	7.44
NMP 48898	Q. Sheisar	f	G	66	52	48.1	18.3	6.8	20.5	17.52	17.17	12.77	3.92	8.56	6.74	5.74	8.12	6.70	13.04	5.03	7.21
NMP 48899	Q. Sheisar	f	G	65	52	49.1	17.9	7.1	19.5	18.03	17.58	12.73	4.13	8.40	6.69	5.93	7.99	6.77	13.30	4.84	7.28
NMP 48900	Baniyas	f	G	63	52	49.3	18.0	6.3	20.2	17.51	17.33	12.34	3.93	8.22	6.47	5.68	7.94	6.60	13.08	4.77	7.21
NMP 48901	Baniyas	f	G	66	54	49.9	19.0	6.9	22.0	18.97	18.38	13.26	4.06	8.63	6.72	6.02	8.17	6.92	14.03	5.23	7.66
NMP 48918	Q. Marqab	m	a	65	53	45.9	17.2	6.5	13.8	17.43	17.12	12.20	4.07	8.44	6.37	5.68	7.73	6.57	12.92	4.66	7.11
NMP 90287	Q. Salah Din	f	s	61	46	47.0	18.0	7.2	19.5	18.32	17.51	12.52	4.21	8.51	6.73	5.74	7.74	6.62	13.51	4.98	7.19
NMP 90288	Q. Salah Din	m	a	66	43	45.9	17.7	7.5	18.5	17.22	16.94	12.21	4.16	8.37	6.27	5.74	8.02	6.62	12.74	4.77	7.19

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Hypsugo savii																					
NMP 48048	Yabroud	m	a	51	41	35.0	13.9	5.0	6.9	13.37	13.17	8.67	3.44	6.62	4.62	4.38	5.70	4.65	9.58	2.75	4.98
NMP 48064	Slinfeh	m	a	55	38	34.1	13.0	4.7	8.2	13.80	13.58	–	3.65	6.75	4.44	4.02	5.74	4.70	9.78	2.78	5.08
NMP 48065	Slinfeh	m	a	50	42	34.9	13.8	4.9	7.1	13.85	13.43	8.97	3.37	6.92	4.57	4.37	5.75	4.61	9.57	3.01	4.85
NMP 48066	Slinfeh	m	a	58	40	32.6	13.7	5.5	6.6	13.62	13.35	8.95	3.37	6.88	4.60	4.32	5.75	4.62	9.53	2.77	4.81
NMP 48067	Slinfeh	m	a	51	40	33.3	13.9	5.1	5.8	13.32	12.92	8.57	3.48	6.73	4.32	4.27	5.57	4.53	9.20	2.75	4.91
NMP 48068	Slinfeh	m	a	50	38	34.6	13.4	4.2	6.5	13.14	12.82	8.58	3.24	6.54	4.43	4.33	5.67	4.52	9.45	2.98	4.81
NMP 48069	Slinfeh	m	a	50	42	34.5	14.5	4.8	6.0	13.81	13.32	8.90	3.41	6.87	4.53	4.39	5.74	4.74	9.88	2.97	5.13
NMP 48070	Slinfeh	m	a	48	42	33.1	14.5	4.4	6.4	13.50	13.22	8.70	3.49	6.76	4.42	4.47	5.65	4.60	9.54	2.80	4.82
NMP 48071	Slinfeh	m	a	57	37	33.5	14.2	4.2	5.6	13.40	12.93	8.82	3.40	6.69	4.64	4.37	5.67	4.55	9.37	2.71	5.01
NMP 48072	Slinfeh	m	a	52	42	33.9	12.9	4.9	5.4	13.42	12.95	8.68	3.54	6.87	4.69	4.22	5.80	4.52	9.40	2.89	4.89
NMP 48076	Sheisar	f	a	58	38	35.1	14.6	5.4	7.2	13.49	13.22	8.50	3.45	6.66	4.28	4.07	5.78	4.60	9.50	2.91	4.88
NMP 48868	Barqash	f	G	52	37	34.8	14.0	3.9	7.7	13.75	13.37	8.52	3.42	6.87	4.49	4.50	5.64	4.76	9.89	2.86	5.09
NMP 48869	Barqash	f	G	52	38	35.3	14.1	4.7	8.6	13.47	13.32	9.10	3.47	6.60	4.42	4.48	5.94	4.74	9.80	2.84	4.93
NMP 48919	Hayalien	m	a	48	38	33.1	14.4	4.9	4.6	13.37	13.02	8.55	3.53	6.74	4.81	4.28	5.58	4.53	9.33	2.85	4.85
NMP 48920	Hayalien	m	a	50	37	34.2	13.2	5.4	5.1	13.06	12.66	8.49	3.62	6.73	4.69	4.10	5.65	4.48	9.13	2.77	4.88
NMP 48921	Hayalien	m	a	51	41	33.2	13.6	4.7	6.0	13.56	13.23	9.20	3.58	6.78	4.63	4.38	6.12	4.63	9.61	2.92	4.83
NMP 48922	Hayalien	m	a	46	37	33.4	14.1	3.8	4.8	13.08	12.74	8.69	3.48	6.62	4.37	4.18	5.76	4.42	9.12	2.82	4.71
NMP 48923	Hayalien	m	a	49	40	32.1	13.2	4.8	4.6	13.22	12.67	8.42	3.23	6.45	4.20	4.15	5.57	4.53	9.28	2.58	4.81
NMP 48932	Qatura	f	G	56	37	35.6	13.6	4.4	12.2	13.85	13.67	9.02	3.65	6.78	4.62	4.43	5.95	4.74	9.75	2.87	5.01
NMP 48933	Qatura	f	L	51	38	33.9	13.1	5.1	7.5	13.47	12.88	8.30	3.40	6.77	4.42	4.25	5.54	4.59	9.42	2.67	4.87
NMP 48934	Qatura	f	L	51	42	36.5	15.3	5.5	8.1	13.68	13.47	9.27	3.44	6.87	4.42	4.76	6.02	4.76	9.76	2.89	5.07
NMP 48980	Maalula	m	a	52	38	34.3	13.8	–	6.3	14.08	13.62	8.72	3.49	6.68	4.75	4.28	5.83	4.82	9.82	2.93	5.13
NMW AB80/513	Golan Heights	f	j	46	39	35.9	13.7	5.7	5.0	13.80	13.25	–	3.83	6.95	–	–	–	4.67	9.62	–	5.07
Pipistrellus pipistrellus																					
NMP 48060	Slinfeh	m	a	46	34	30.2	10.6	4.4	4.3	11.55	11.12	7.25	3.30	6.22	4.32	3.53	4.82	4.15	8.27	2.31	4.44
NMP 48061	Slinfeh	m	a	47	33	30.2	12.2	5.4	4.5	11.51	11.11	–	2.87	5.91	4.17	3.42	4.76	4.03	8.08	2.67	4.30
NMP 48062	Slinfeh	m	a	44	36	31.7	12.5	5.2	4.4	11.60	11.43	–	3.10	6.03	4.36	3.55	4.94	4.35	8.18	2.33	4.55
NMP 48063	Slinfeh	m	a	40	35	30.0	11.1	4.8	4.1	11.55	11.19	–	3.03	5.98	4.37	3.40	4.75	4.05	8.03	2.23	4.32
NMP 48084	Rabi’ah	f	a	43	34	28.9	12.1	4.6	5.2	11.62	11.22	7.49	3.20	6.15	4.28	3.60	4.82	4.15	8.12	2.43	4.36
NMP 48085	Rabi’ah	f	a	44	30	29.6	10.7	4.6	4.6	11.62	11.28	7.22	3.17	5.75	4.06	3.48	4.92	4.18	8.28	2.48	4.47
NMP 48086	Kassab	f	s	40	28	29.7	11.4	4.5	3.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48871	Sarghaya	f	a	39	34	31.8	12.6	6.0	4.7	12.15	11.53	7.52	3.17	6.12	4.18	3.77	4.90	4.28	8.29	2.41	4.54
NMP 48872	Sarghaya	m	a	36	31	30.4	12.0	4.7	3.4	11.62	11.08	7.39	3.28	6.23	4.28	3.48	4.68	4.07	8.18	2.36	4.17
NMP 48902	Baniyas	f	G	40	33	30.7	11.1	4.6	6.2	11.77	11.32	7.62	3.20	6.12	4.28	3.59	5.04	4.13	8.27	2.37	4.33
NMP 48981	Maalula	m	a	40	33	29.6	10.8	4.7	3.6	11.91	11.37	7.52	3.32	5.99	4.09	3.59	4.82	4.37	8.39	2.37	4.62
NMP 48982	Maalula	m	–	40	33	30.1	10.2	4.1	3.5	11.78	11.22	7.12	3.21	6.08	4.28	3.60	4.74	4.22	7.90	2.34	4.42
NMP 48983	Maalula	m	a	40	35	31.2	10.9	4.8	4.1	11.78	11.27	7.36	3.03	5.92	4.27	3.55	4.81	4.21	8.25	2.41	4.47
NMP 48984	Maalula	m	–	41	31	29.6	10.5	4.9	3.7	11.37	10.79	–	3.08	5.76	4.04	3.36	4.62	4.04	7.93	2.33	4.22
NMP 49986	Ras al Bassit	f	–	–	–	–	–	–	–	11.94	11.52	7.62	3.30	6.29	4.25	3.55	4.87	4.17	8.42	2.57	4.42
NMP 90279	Maalula	m	a	–	–	30.4	–	–	4.0	–	–	–	–	–	–	–	–	–	–	–	–
Pipistrellus kuhlii																					
MNHN 1983-1500	Djéroud	m	–	–	–	34.0	–	–	–	13.13	–	8.35	3.34	6.68	4.78	4.20	5.68	4.96	9.28	2.95	5.21

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Pipistrellus kuhlii																					
NMP 47962	Hama	m	a	44	35	33.6	12.3	5.1	5.2	–	–	–	3.37	6.63	4.54	3.73	5.32	4.69	9.13	2.77	5.13
NMP 47963	Hama	m	j	43	27	27.8	10.1	4.6	4.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 47964	Hama	m	j	40	31	29.7	11.3	6.6	3.8	–	–	–	–	–	–	–	–	–	–	–	–
NMP 47993	Rasafah	m	a	52	42	34.7	11.6	7.2	6.6	13.33	12.93	8.72	3.32	6.78	4.68	4.17	5.46	4.92	9.55	2.88	5.29
NMP 47994	Rasafah	m	a	54	43	35.6	13.6	6.3	7.7	13.81	13.24	8.96	3.42	6.85	4.92	4.42	5.75	5.03	9.87	2.98	5.31
NMP 47995	Rasafah	m	a	50	42	35.7	12.6	5.7	7.5	13.27	12.87	8.78	3.38	6.85	4.88	4.32	5.92	5.11	9.82	3.15	5.53
NMP 47996	Rasafah	m	a	52	43	33.4	13.4	6.0	7.1	13.08	12.88	8.79	3.25	6.43	4.78	4.21	5.73	4.97	9.60	2.92	5.38
NMP 47997	Rasafah	m	a	51	41	35.9	13.4	6.5	6.9	13.62	13.02	8.70	3.37	6.81	5.16	4.43	5.68	5.03	9.82	2.98	5.34
NMP 47998	Rasafah	f	L	50	41	33.9	13.4	5.8	6.4	13.28	12.67	–	3.37	6.63	4.83	4.12	5.52	4.81	9.58	3.14	5.20
NMP 47999	Rasafah	m	a	53	44	35.0	13.6	6.0	7.1	13.32	12.95	8.55	3.49	6.63	4.82	4.08	5.78	4.99	9.73	3.10	5.40
NMP 48000	Rasafah	m	j	46	36	33.3	13.5	5.8	4.6	–	12.28	–	3.37	6.60	4.32	3.68	5.28	4.67	9.02	2.74	5.11
NMP 48001	Rasafah	m	j	43	41	34.6	13.6	5.6	5.2	13.08	12.57	–	3.43	6.53	4.52	3.77	5.34	4.88	9.57	2.89	5.31
NMP 48002	Rasafah	f	j	50	38	35.6	13.0	5.9	5.5	13.21	12.65	–	3.30	6.62	4.59	3.64	5.39	4.73	9.63	2.83	5.25
NMP 48003	Rasafah	m	j	45	34	33.0	12.6	5.6	4.4	13.07	12.42	–	3.28	6.51	4.55	3.88	5.39	4.68	9.50	2.89	5.13
NMP 48004	Rasafah	m	j	43	36	33.2	12.7	5.6	5.2	–	–	–	3.47	6.62	–	3.98	5.68	5.00	9.28	2.92	5.13
NMP 48005	Rasafah	m	j	53	37	34.8	11.7	5.6	4.9	13.00	12.57	–	3.22	6.45	4.56	3.97	5.62	4.82	9.44	3.09	5.42
NMP 48028	Halabiyyeh	m	a	48	40	34.2	12.3	6.0	6.1	12.97	12.48	–	3.34	6.70	4.75	4.08	5.52	4.87	9.39	2.83	5.17
NMP 48029	Halabiyyeh	m	a	47	34	33.2	12.8	5.4	5.7	13.18	12.89	8.58	3.20	6.59	4.71	4.05	5.43	4.92	9.35	2.94	5.34
NMP 48032	T. S. Hamad	f	s	52	38	34.6	12.9	5.7	5.7	12.78	12.24	–	3.28	6.43	4.48	4.19	5.43	4.67	9.16	2.77	5.13
NMP 48033	T. S. Hamad	f	a	48	41	34.9	11.8	5.8	6.6	13.17	12.57	–	3.47	6.65	4.72	4.08	5.70	4.88	9.53	2.95	5.26
NMP 48034	T. S. Hamad	f	L	49	43	36.1	14.0	5.8	6.5	13.67	13.05	–	3.35	6.77	4.73	4.29	5.75	5.04	9.88	2.98	5.47
NMP 48035	T. S. Hamad	m	a	49	40	33.8	12.7	5.3	5.3	12.71	12.15	–	3.26	6.59	4.49	3.85	5.34	4.75	9.21	2.77	5.15
NMP 48036	T. S. Hamad	m	a	52	39	34.0	12.6	5.9	5.5	13.31	12.76	8.51	3.22	6.72	4.80	4.15	5.53	5.03	9.69	3.17	5.38
NMP 48758	Q. Najm	m	a	53	41	34.7	12.7	5.8	6.5	12.92	12.38	–	3.21	6.54	4.38	4.19	5.45	4.89	9.41	2.87	5.18
NMP 48767	Q. Ja'abar	m	a	49	39	33.3	13.4	5.4	6.4	13.20	12.73	8.73	3.48	6.69	4.67	4.18	5.58	5.03	9.58	3.07	5.32
NMP 48768	Q. Ja'abar	m	–	48	40	34.2	13.8	5.6	5.5	13.32	12.85	8.22	3.19	6.42	4.59	4.12	5.47	5.02	9.74	3.00	5.34
NMP 48769	Q. Ja'abar	m	–	51	43	36.5	13.5	5.4	7.7	13.68	13.32	9.12	3.33	6.88	4.82	4.52	5.96	5.18	10.12	3.21	5.58
NMP 48784	Rasafah	m	a	55	42	34.8	12.7	6.1	6.4	13.13	12.70	8.76	3.37	6.57	4.61	4.13	5.55	4.79	9.54	2.98	5.12
NMP 48785	Rasafah	m	a	53	42	34.5	12.0	6.7	6.6	13.85	13.18	8.68	3.38	6.75	4.68	4.30	5.82	5.08	9.75	2.97	5.39
NMP 48786	Rasafah	m	a	55	43	34.9	12.5	5.7	6.5	13.38	12.98	8.58	3.41	6.62	4.62	4.36	5.68	5.09	9.75	3.07	5.41
NMP 48787	Rasafah	m	a	48	44	35.8	14.4	5.8	6.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48788	Rasafah	m	a	52	40	34.3	13.2	6.2	6.1	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48789	Rasafah	f	L	56	41	36.2	13.4	7.1	7.7	13.12	13.02	8.66	3.38	6.60	4.88	4.31	5.87	4.94	9.74	3.18	5.40
NMP 48790	Rasafah	f	L	51	39	34.6	13.5	6.6	7.6	13.23	12.79	8.59	3.33	6.47	4.51	4.02	5.74	4.83	9.65	2.87	5.19
NMP 48791	Rasafah	f	a	54	40	34.6	14.0	6.4	6.9	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48792	Rasafah	f	G	53	45	36.3	13.4	6.5	12.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48800	Sbeikhan	m	a	46	42	33.6	12.7	5.6	5.9	12.75	12.31	8.07	3.12	6.42	4.47	4.02	5.38	4.88	9.07	2.78	5.18
NMP 48801	Sbeikhan	m	a	44	41	33.8	13.1	6.1	5.6	13.05	12.63	8.68	3.25	6.79	4.77	4.03	5.43	4.78	9.48	2.97	5.18
NMP 48802	Sbeikhan	m	a	41	40	34.9	13.0	6.0	5.5	13.07	12.42	8.36	3.18	6.48	4.70	3.96	5.35	4.83	9.26	2.85	5.18
NMP 48803	Sbeikhan	f	s	47	40	34.2	12.5	6.2	5.7	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48807	Abu Kemal	f	L	48	40	34.7	13.1	5.8	6.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48808	Abu Kemal	f	L	48	38	35.3	13.1	6.1	7.8	12.97	12.67	–	3.35	6.64	4.64	3.98	5.57	4.82	9.26	2.86	5.13
NMP 48809	Abu Kemal	f	L	50	39	33.9	12.2	5.7	6.8	12.81	12.36	8.11	3.28	6.54	4.69	4.09	5.22	4.66	9.22	2.81	5.13

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Pipistrellus kuhlii																					
NMP 48810	Abu Kemal	f	L	48	40	34.6	12.9	5.1	6.4	13.14	12.75	8.42	3.15	6.63	4.53	4.18	5.44	4.87	9.47	2.78	5.21
NMP 48811	Abu Kemal	f	L	54	42	34.1	13.2	5.4	6.9	12.93	12.48	–	3.25	6.62	4.60	4.12	5.39	4.68	9.58	2.98	5.02
NMP 48814	Q. Rahba	m	a	50	44	34.7	13.2	5.4	6.1	13.57	13.18	8.87	3.37	6.76	4.49	4.15	5.67	4.97	10.01	3.22	5.34
NMP 48820	Khazneh	m	a	48	40	34.1	12.9	6.5	5.1	13.02	12.65	8.58	3.42	6.62	4.58	4.34	5.58	5.07	8.54	3.02	2.93
NMP 48821	Khazneh	m	a	48	41	34.7	12.1	6.2	6.2	13.12	12.74	8.61	3.43	6.67	4.54	4.09	5.62	4.73	9.35	2.92	5.07
NMP 48824	Ain Diwar	f	a	48	42	35.2	13.7	6.2	6.5	13.29	12.82	8.58	3.40	6.72	4.82	4.08	5.35	4.94	9.67	2.94	5.32
NMP 48825	Ain Diwar	f	L	54	41	35.2	12.1	5.7	6.4	13.45	12.93	8.88	3.48	6.83	4.82	4.13	5.72	4.96	9.77	3.15	5.18
NMP 48831	Ayyash	f	L	47	39	34.2	13.3	6.1	6.7	12.77	12.33	–	3.12	6.33	4.53	4.07	5.27	4.76	9.18	2.78	5.12
NMP 48832	Ayyash	f	L	49	41	35.8	12.9	5.6	7.0	13.27	12.91	8.42	3.32	6.62	4.62	4.03	5.57	4.94	9.45	2.75	5.12
NMP 48833	Ayyash	f	L	51	41	35.2	13.5	5.5	7.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48834	Ayyash	m	–	49	45	36.0	13.6	5.6	6.1	–	–	–	3.38	6.65	–	3.98	5.43	4.93	9.67	2.87	5.28
NMP 48835	Ayyash	m	–	53	41	34.4	12.7	5.7	5.8	13.13	12.75	8.53	3.47	6.75	4.77	–	5.57	–	9.45	2.98	–
NMP 48836	Ayyash	m	–	48	43	33.4	13.2	5.8	5.3	12.92	12.55	–	3.34	6.44	4.47	4.04	5.38	4.88	9.43	2.74	5.18
NMP 48837	Tadmor	m	a	49	39	34.5	13.1	5.5	5.0	13.48	12.85	8.28	3.32	6.55	4.70	4.17	5.62	4.96	9.67	2.97	5.28
NMP 48838	Tadmor	m	a	49	40	33.5	13.3	6.1	4.4	12.81	12.34	8.32	3.33	6.67	4.56	4.20	5.53	5.02	9.17	3.02	5.28
NMP 48839	Tadmor	f	a	52	40	35.4	12.4	5.5	6.6	13.80	13.25	8.77	3.34	6.70	4.97	4.32	5.84	5.13	9.94	3.07	5.34
NMP 48840	Tadmor	f	L	47	38	34.7	12.7	5.4	5.6	13.14	12.62	8.53	3.37	6.60	4.68	4.22	5.82	4.97	9.47	3.02	5.17
NMP 48841	Tadmor	f	L	51	38	35.0	12.6	6.1	5.3	13.27	12.57	8.58	3.38	6.68	4.57	4.22	5.53	4.90	9.56	3.17	5.37
NMP 48842	Tadmor	f	L	53	41	36.0	12.8	5.1	7.4	13.67	13.37	8.84	3.44	6.75	4.78	4.32	5.75	5.07	9.87	3.21	5.32
NMP 48843	Tadmor	f	L	50	37	35.9	13.1	6.3	6.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48844	Al Tawani	m	a	50	43	36.0	12.7	6.4	6.5	13.47	13.18	8.73	3.35	6.47	4.78	4.17	5.69	4.98	9.94	3.05	5.38
NMP 48845	Al Tawani	m	a	51	42	34.6	13.3	5.7	5.7	13.18	12.91	8.58	3.26	6.34	4.62	4.12	5.59	4.97	9.58	2.87	5.33
NMP 48846	Al Tawani	f	a	48	43	36.1	13.6	5.8	8.6	13.45	13.04	8.84	3.37	6.71	4.75	4.15	5.87	5.02	9.58	3.05	5.35
NMP 48847	Al Tawani	f	a	49	42	34.7	13.9	5.6	6.5	13.42	13.04	8.54	3.22	6.43	4.70	4.43	5.98	5.07	9.75	3.07	5.37
NMP 48848	Al Tawani	f	a	52	42	34.3	14.2	5.6	8.1	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48862	Talsh'hab	f	L	49	37	34.2	13.9	6.3	6.0	13.38	13.02	8.85	3.45	6.67	4.75	4.37	5.83	5.15	9.87	3.18	5.55
NMP 48863	Talsh'hab	f	L	52	41	35.8	13.2	5.7	6.5	13.43	12.94	8.87	3.45	6.74	4.68	4.41	5.93	4.98	9.80	3.00	5.34
NMP 48864	Talsh'hab	f	G	51	42	35.0	14.7	5.2	9.1	13.32	12.71	8.69	3.38	6.61	4.80	4.38	5.92	4.98	9.67	3.07	5.34
NMP 48884	Safita	f	a	51	42	35.0	14.2	6.9	8.0	13.87	13.28	8.68	3.32	6.75	5.02	4.55	5.96	5.07	9.84	2.97	5.47
NMP 48885	Safita	m	a	51	42	32.1	14.1	6.7	6.1	13.67	13.25	9.07	3.44	6.70	5.08	4.27	5.92	5.08	9.78	3.02	5.43
NMP 48886	Safita	m	a	48	42	35.0	14.3	6.3	6.7	13.56	13.27	8.63	3.20	6.59	4.81	4.39	5.67	5.02	9.76	2.88	5.36
NMP 48887	Safita	f	L	53	40	34.9	13.9	6.7	8.0	13.42	13.13	8.68	3.36	6.64	4.88	4.42	5.81	5.08	9.73	3.18	5.48
NMP 48888	Qantara	f	L	53	39	34.1	13.1	5.8	5.6	13.03	12.47	8.49	3.44	6.63	4.80	4.02	5.57	4.93	9.35	3.05	5.27
NMP 48889	Qantara	f	L	52	39	35.7	15.2	5.9	7.5	13.73	13.37	8.73	3.37	6.68	4.85	4.27	5.82	5.13	10.17	3.22	5.54
NMP 48890	Qantara	f	L	49	46	36.3	13.6	6.5	7.1	13.88	13.37	9.24	3.53	6.87	4.88	4.42	5.84	5.21	10.27	3.31	5.59
NMP 48891	Q. ibn Wardan	m	a	51	43	35.4	13.1	6.2	6.2	13.46	12.91	8.58	3.23	6.62	4.74	4.43	5.68	5.07	9.73	2.93	5.38
NMP 48903	Baniyas	f	G	50	40	34.8	13.2	5.9	8.4	13.44	13.27	9.03	3.32	6.79	5.00	4.38	5.87	5.08	10.10	3.24	5.47
NMP 48904	Baniyas	f	G	47	41	35.5	13.5	5.9	7.6	12.87	12.58	8.64	3.42	6.44	4.82	4.21	5.74	4.88	9.54	2.93	5.27
NMP 48905	Baniyas	f	G	42	37	33.1	13.0	5.1	5.7	12.83	12.51	8.24	3.26	6.22	4.42	4.02	5.69	4.86	9.48	2.92	5.24
NMP 48906	Baniyas	m	a	48	39	35.1	13.6	6.0	5.2	13.03	12.52	8.73	3.28	6.38	4.71	4.28	5.86	4.93	9.56	2.88	5.28
NMP 48907	Baniyas	m	a	47	41	33.1	13.7	5.8	4.9	13.44	12.98	8.57	3.29	6.54	4.88	4.25	5.77	5.12	9.67	3.07	5.33
NMP 48908	Baniyas	m	a	47	40	33.7	13.3	5.7	4.8	13.42	12.94	8.51	3.39	6.47	4.71	4.29	5.68	4.98	9.71	2.88	5.37
NMP 48929	Qatura	f	G	52	42	36.1	13.6	6.1	9.1	13.43	13.07	8.83	3.27	6.74	4.85	4.42	5.75	4.94	9.70	3.19	5.32

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^{3}M^3	CM^3	LMd	ACo	CM$_3$
Pipistrellus kuhlii																					
NMP 48930	Qatura	m	a	49	43	36.1	13.5	5.9	6.2	13.17	12.98	8.82	3.38	6.74	4.54	4.32	5.99	5.12	9.77	3.10	5.51
NMP 48931	Qatura	m	a	48	43	34.3	14.0	5.9	5.4	13.57	13.35	8.70	3.40	6.75	4.62	4.23	5.68	5.20	9.72	2.98	5.52
NMP 48947	Ras al Bassit	m	a	52	41	34.0	13.4	6.6	6.0	13.38	13.02	8.66	3.18	6.78	4.76	4.28	5.82	5.02	9.62	3.05	5.32
NMP 48948	Rasafah	m	a	46	37	33.8	12.5	5.8	6.1	13.32	12.82	8.45	3.44	6.65	4.75	4.31	5.56	4.98	9.45	2.95	5.30
NMP 48949	Rasafah	m	a	48	37	35.4	13.1	6.0	6.3	13.24	12.93	8.67	3.33	6.58	4.90	4.25	5.46	4.92	9.58	3.05	5.20
NMP 48950	Rasafah	m	a	48	38	35.1	12.4	5.4	6.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48951	Rasafah	m	a	48	38	33.8	12.0	5.9	6.7	13.45	13.12	–	3.38	6.85	4.86	4.14	5.58	4.93	9.65	2.84	5.29
NMP 48952	Rasafah	m	a	47	36	34.8	12.3	6.0	6.7	13.48	13.03	8.65	3.30	6.81	4.82	4.05	5.42	4.87	9.88	3.07	5.27
NMP 48953	Rasafah	f	s	50	38	34.8	12.8	6.0	7.9	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48954	Rasafah	m	a	48	38	36.0	12.3	6.3	6.8	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48955	Rasafah	m	a	49	40	36.1	13.2	6.4	7.9	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48956	Rasafah	f	s	51	37	34.4	12.0	6.0	7.7	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48957	Rasafah	m	a	47	40	34.4	12.6	5.9	7.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48958	Rasafah	m	a	49	39	33.8	13.7	5.8	7.4	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48959	Rasafah	m	a	51	39	36.4	13.1	6.4	7.8	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48966	Halabiyyeh	m	a	48	42	34.9	13.4	5.6	6.1	13.41	12.87	8.50	3.34	6.62	4.73	4.38	5.68	5.09	9.56	2.87	5.43
NMP 48967	Halabiyyeh	m	–	50	41	35.1	12.0	6.0	5.7	13.37	12.77	8.37	3.30	6.54	4.58	4.28	5.58	4.90	9.60	2.94	5.22
NMP 48968	Halabiyyeh	m	–	47	40	33.4	12.6	5.5	5.4	13.02	12.61	–	3.22	6.42	4.36	4.25	5.54	4.82	9.35	2.96	5.08
NMP 48969	Halabiyyeh	m	–	50	39	34.8	12.0	5.7	6.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48970	Halabiyyeh	m	–	49	38	35.2	12.3	5.5	5.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48971	Halabiyyeh	m	–	49	40	36.8	12.2	5.1	6.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 49987	Ras al Bassit	f	–	–	–	–	–	–	–	13.29	12.88	8.58	3.32	6.43	4.68	4.28	5.73	4.99	9.74	2.95	5.34
NMP 49988	Q. Hosn	m	–	–	–	–	–	–	–	13.39	13.07	8.67	3.43	6.54	4.85	4.38	5.75	4.97	9.67	3.09	5.33
NMW 26294	Raqqa	f	a	48	36	33.4	11.9	6.0	7.0	–	–	–	3.47	6.75	–	–	–	4.88	9.67	–	5.17
NMW 26295	Raqqa	f	a	47	37	34.2	11.8	5.3	8.0	13.55	13.17	8.88	3.47	6.68	–	–	–	4.95	9.74	–	5.47
NMW 26296	Raqqa	f	a	48	42	35.6	12.2	4.9	8.0	13.41	12.95	8.93	3.45	6.85	–	–	–	4.92	9.53	–	5.30
NMW 26297	Raqqa	m	j	41	30	30.6	11.5	5.3	5.0	–	–	–	–	5.93	–	–	–	4.50	8.92	–	4.90
NMW 26298	Raqqa	f	a	47	36	30.5	11.5	5.3	5.0	12.88	12.38	8.37	3.22	6.52	–	–	–	4.68	9.32	–	5.12
NMW 26299	Raqqa	f	j	51	35	34.7	12.7	5.2	8.5	12.82	12.05	–	3.48	6.60	–	–	–	4.55	9.58	–	5.33
NMW 26300	Raqqa	f	s	41	29	32.2	11.0	4.9	5.5	–	12.18	–	3.22	6.35	–	–	–	4.78	9.18	–	5.25
NMW 26301	Raqqa	f	a	41	29	32.6	11.1	5.1	6.5	13.27	13.18	8.87	3.38	6.78	–	–	–	5.08	9.07	–	4.90
NMW 26302	Raqqa	f	s	43	33	32.8	11.8	5.8	6.0	–	–	–	3.53	–	–	–	–	4.78	9.52	–	5.15
NMW 26303	Raqqa	f	s	45	31	32.7	10.6	4.9	6.0	12.78	–	–	3.60	6.60	–	–	–	4.52	9.12	–	5.12
NMW 26304	Raqqa	f	s	42	27	32.7	11.8	5.8	6.0	–	–	–	3.42	6.48	–	–	–	4.65	8.85	–	5.03
NMW 26305	Raqqa	f	a	49	39	35.4	12.2	6.0	9.0	13.67	13.02	8.83	3.43	6.82	–	–	–	4.95	9.52	–	5.35
NMW 26306	Raqqa	m	s	40	32	31.6	11.0	5.3	5.5	12.90	–	–	3.37	6.63	–	–	–	4.73	9.40	–	5.00
NMW 26316	Meyadin	m	a	48	38	33.9	12.0	5.0	7.5	13.27	12.88	–	3.32	6.52	–	–	–	4.87	9.52	–	5.27
NMW 26317	Meyadin	f	a	49	38	33.9	11.8	4.9	7.5	13.37	12.77	–	3.35	6.78	–	–	–	5.00	9.65	–	5.42
NMW 26318	Meyadin	m	a	47	37	34.5	11.6	5.2	6.5	13.48	12.97	8.62	3.23	6.52	–	–	–	4.92	9.52	–	5.28
NMW 26319	Meyadin	f	a	47	39	33.5	11.9	5.0	7.0	13.02	12.78	8.68	3.33	6.88	–	–	–	4.77	9.53	–	5.08
NMW 26320	Meyadin	f	a	47	38	34.7	12.5	5.0	7.0	13.53	12.98	8.95	3.33	6.77	–	–	–	5.05	9.65	–	5.33
NMW 26321	Meyadin	f	a	43	38	34.1	11.3	5.2	5.0	12.84	12.32	–	3.17	6.43	–	–	–	4.75	9.35	–	5.20
NMW 26322	Meyadin	f	a	44	37	33.8	11.8	5.7	6.0	13.17	12.62	8.75	3.22	6.67	–	–	–	4.68	9.38	–	5.03

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Pipistrellus kuhlii																					
NMW 26323	Meyadin	f	a	48	38	34.8	12.0	6.1	5.5	13.12	12.70	–	3.27	6.63	–	–	–	4.95	9.58	–	5.26
NMW 26324	Meyadin	f	a	47	41	36.3	13.2	6.3	6.0	13.33	12.97	–	3.38	6.70	–	–	–	4.92	9.90	–	5.37
NMW 26325	Meyadin	f	a	47	36	32.8	12.0	6.0	5.5	–	–	–	3.37	–	–	–	–	4.75	–	–	5.23
NMW 26326	Meyadin	m	a	47	41	34.5	12.6	6.1	–	13.20	12.75	8.75	3.42	6.66	–	–	–	4.90	9.65	–	5.35
NMW 26327	Meyadin	f	a	48	41	33.9	12.4	5.7	6.0	13.25	12.82	8.92	3.41	6.67	–	–	–	4.93	9.58	–	5.33
NMW 26328	Meyadin	m	a	45	35	34.1	11.6	5.9	4.5	12.74	12.25	8.33	3.18	6.43	–	–	–	4.77	9.17	–	5.20
NMW 26329	Meyadin	m	a	46	36	32.8	12.0	6.0	5.5	13.05	12.58	8.82	3.35	6.72	–	–	–	4.87	9.42	–	5.32
NMW 26330	Meyadin	m	a	47	37	33.6	12.0	6.1	5.0	13.12	12.83	–	3.25	6.58	–	–	–	4.92	9.43	–	5.27
NMW 26331	Meyadin	m	a	46	37	36.5	12.5	6.9	6.0	13.75	13.22	–	3.40	7.02	–	–	–	4.92	9.96	–	5.30
NMW 26332	Meyadin	f	a	45	37	34.2	11.9	5.9	5.0	12.96	12.52	8.77	3.32	6.77	–	–	–	4.85	9.38	–	4.22
NMW 26333	Meyadin	m	a	47	39	33.8	13.0	5.5	7.0	13.23	12.88	–	3.33	6.78	–	–	–	4.97	9.62	–	5.38
NMW 26334	Meyadin	m	a	47	39	33.6	12.7	5.2	6.5	13.32	12.92	–	3.22	6.57	–	–	–	4.98	9.53	–	5.47
NMW 26335	Meyadin	f	a	48	38	35.6	12.2	5.4	9.0	–	–	–	–	6.72	–	–	–	4.88	9.52	–	5.33
NMW 26336	Meyadin	f	a	47	43	35.1	11.7	5.3	–	13.25	12.87	–	3.37	6.67	–	–	–	4.88	9.42	–	5.15
NMW 26337	Meyadin	m	a	47	36	35.1	11.7	5.3	5.0	–	12.65	8.65	3.22	6.63	–	–	–	4.92	9.53	–	5.25
NMW 26338	Meyadin	m	a	49	35	35.6	12.6	6.0	6.5	13.60	13.08	–	3.42	6.90	–	–	–	4.82	9.67	–	5.17
NMW 26339	Meyadin	m	a	48	35	33.7	12.5	6.2	5.5	13.30	12.87	–	3.42	6.72	–	–	–	4.97	9.53	–	5.32
NMW 26340	Meyadin	f	a	47	39	34.6	11.5	5.2	5.5	13.32	12.97	–	3.37	6.67	–	–	–	4.97	9.48	–	5.32
NMW AB890/512	Golan Heights	m	a	45	35	31.2	12.2	6.8	5.0	12.85	12.33	8.35	3.20	6.48	–	–	–	4.75	9.35	–	5.12
NMW AB890/514	Golan Heights	m	–	47	36	34.9	14.0	6.8	6.0	13.60	13.23	8.57	3.43	6.37	–	–	–	5.12	–	–	–
NMW AM812/100	Golan Heights	–	–	–	–	33.1	–	–	–	13.42	12.83	8.77	3.42	6.55	–	–	–	4.80	9.75	–	5.35
NMW AM812/99	Golan Heights	–	a	–	–	33.1	–	–	–	13.35	12.73	8.65	3.37	6.77	–	–	–	5.02	9.57	–	5.37
NMW KK19	Golan Heights	–	a	–	–	34.9	–	–	–	13.25	12.73	–	3.35	6.50	–	–	–	5.03	9.63	–	5.37
RLC SY9	Rasafah	m	a	52	33	36.5	13.3	6.3	7.0	–	–	–	–	–	–	–	–	–	–	–	–
Nyctalus noctula																					
NMP 48876	Safita	m	a	77	48	52.1	18.1	6.5	26.0	18.12	18.37	13.14	5.26	9.87	6.72	6.92	8.28	7.35	14.08	4.62	7.74
NMP 48877	Safita	f	G	80	55	54.5	20.1	7.1	27.8	18.87	18.93	13.38	5.17	9.83	6.68	7.24	8.77	7.56	14.18	4.77	7.97
NMP 48878	Safita	f	G	82	55	51.6	18.7	6.1	35.8	18.17	18.56	13.32	5.17	10.03	6.73	7.53	8.67	7.32	14.18	4.82	7.82
NMP 48879	Safita	m	a	78	52	51.7	17.9	6.8	25.9	19.22	19.12	13.48	5.18	10.51	6.74	7.46	8.73	7.68	14.48	4.74	7.98
Otonycteris hemprichii																					
MNHN 1983-1485	Djéroud	m	–	–	–	59.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48006	Rasafah	f	j	56	30	37.0	20.0	8.0	10.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48007	Rasafah	f	L	76	47	56.1	34.1	15.6	21.7	22.13	21.24	14.57	4.48	9.93	7.75	6.17	9.47	7.98	16.12	7.08	8.97
NMP 48008	Rasafah	f	L	81	56	60.1	35.5	16.6	22.0	22.85	–	14.70	4.18	10.29	–	6.47	9.68	8.30	16.32	7.17	9.32
NMP 48009	Rasafah	f	L	82	57	59.3	35.4	16.1	22.8	22.47	21.78	14.70	4.50	9.98	7.34	6.33	9.58	8.12	16.17	7.06	8.92
NMP 48010	Rasafah	f	L	83	58	61.7	34.0	16.4	23.2	22.96	21.91	14.63	4.48	10.50	7.73	6.34	9.84	8.30	16.25	7.39	9.20
NMP 48011	Rasafah	f	j	53	26	31.6	17.6	7.0	7.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48012	Rasafah	m	j	53	28	34.7	18.4	8.5	7.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48013	Rasafah	m	j	50	28	33.0	18.3	7.7	6.6	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48014	Rasafah	m	a	69	49	56.6	34.0	15.3	17.8	21.95	21.12	14.25	4.20	10.14	7.15	5.98	9.37	8.11	15.72	6.60	9.03
NMP 48767	Al Ghazli	m	s	75	49	56.1	33.6	14.7	19.5	22.02	20.81	14.93	4.55	10.25	7.16	6.29	9.77	8.21	15.67	7.01	9.08
NMP 48783	Rasafah	m	a	75	54	57.6	36.3	15.0	22.2	22.17	20.87	14.87	4.51	10.41	7.32	6.10	10.08	8.11	15.85	6.90	9.07

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^{3}M^3	CM^3	LMd	ACo	CM$_3$
Otonycteris hemprichii																					
NMP 48812	Q. Rahba	m	a	74	51	57.2	34.1	17.7	19.2	21.07	20.17	14.20	4.42	9.92	7.32	5.78	9.53	7.72	15.12	6.48	8.74
NMP 48815	Khazneh	f	a	79	52	58.4	33.0	14.8	26.0	22.20	21.14	14.45	4.31	10.25	6.75	6.09	9.52	8.28	16.13	6.76	9.25
NMP 48816	Khazneh	m	a	77	52	57.4	35.8	15.4	24.0	22.72	21.60	14.55	4.47	10.47	7.12	6.44	9.72	8.12	15.95	6.58	9.08
NMP 48817	Khazneh	m	a	77	51	55.1	34.2	14.6	20.5	21.93	21.18	14.19	4.36	10.22	7.23	6.22	9.39	8.07	–	–	–
NMP 48827	Ayyash	m	–	73	57	59.6	37.5	16.4	20.8	22.30	21.38	13.96	4.28	9.93	7.02	6.07	9.42	8.14	15.75	6.72	9.12
NMP 48828	Ayyash	m	a	77	54	56.0	35.1	16.1	20.0	22.17	20.85	14.08	4.37	10.10	7.27	5.82	9.24	7.92	15.58	6.79	8.92
NMP 48829	Ayyash	m	–	72	47	56.0	35.0	14.4	19.9	21.61	20.27	14.07	4.38	10.04	7.07	5.85	9.28	7.87	15.12	6.49	8.75
NMP 48830	Ayyash	m	–	71	47	57.1	35.1	14.5	18.2	21.69	20.59	14.78	4.39	10.07	7.12	6.13	9.78	7.98	15.68	6.95	8.97
NMP 90283	Rasafah	f	a	82	48	60.2	35.3	17.0	37.0	23.27	22.54	15.38	4.27	10.74	7.44	6.54	10.44	8.59	16.52	7.34	9.55
Plecotus macrobullaris																					
MNHN 1983-1996	Djéroud	f	–	–	–	39.8	35.3	16.2	–	16.76	15.38	8.82	3.55	8.47	5.45	3.68	6.25	5.55	10.30	2.67	5.96
NMP 48052	Yabroud	f	L	52	54	42.4	38.1	19.2	7.3	17.23	15.94	8.78	3.22	8.38	5.32	3.75	6.09	5.65	10.85	2.88	6.23
NMP 48053	Yabroud	f	L	53	58	43.9	38.3	18.0	7.9	17.69	16.37	9.17	3.43	8.68	5.60	3.69	6.33	5.68	11.17	3.02	6.35
NMP 48849	Ras Al Ain	m	a	49	54	40.2	39.8	17.8	7.5	17.27	16.07	9.07	3.53	8.48	5.56	3.91	6.37	5.68	10.89	3.13	6.28
NMP 48850	Ras Al Ain	m	a	48	52	41.7	38.8	17.6	6.8	17.13	15.89	9.22	3.62	8.42	5.43	3.72	6.16	5.47	10.76	2.87	5.93
NMP 48851	Ras Al Ain	f	G	53	57	44.6	38.0	18.1	10.1	17.44	16.23	8.88	3.47	8.47	5.42	3.85	6.29	5.52	10.81	2.95	6.09
NMP 48852	Ras Al Ain	f	G	52	54	44.1	39.9	19.5	10.0	17.35	16.32	9.04	3.37	8.61	5.64	3.77	6.12	5.64	11.02	3.15	6.07
NMP 48853	Ras Al Ain	f	G	49	48	43.3	38.5	16.9	9.6	17.52	16.21	8.99	3.67	8.83	5.57	3.86	6.32	5.62	11.02	3.23	6.25
NMP 48989	Maalula	f	–	49	48	40.6	38.8	17.1	8.0	17.03	15.96	9.22	3.39	8.45	5.62	3.86	6.42	5.63	11.12	3.12	6.23
NMP 48990	Maalula	f	G	52	53	43.1	36.7	17.4	9.0	17.84	16.42	8.93	3.42	8.54	5.57	3.75	6.27	5.78	11.18	3.22	6.31
NMP 48991	Maalula	f	G	47	53	42.5	39.5	17.2	9.0	17.59	16.18	8.81	3.64	8.32	5.57	3.74	6.02	5.63	11.09	3.08	6.12
NMP 48992	Maalula	f	G	50	49	42.9	38.7	17.6	9.0	17.27	16.07	9.11	3.43	8.49	5.60	3.88	6.27	5.67	11.13	3.28	6.18
NMP 48993	Maalula	f	G	48	50	42.3	37.4	17.8	9.0	17.42	16.11	9.12	3.53	8.62	5.58	3.92	6.36	5.59	11.10	3.02	6.17
NMP 48994	Maalula	m	–	48	48	42.0	34.5	17.5	7.0	16.94	15.78	8.90	3.42	8.62	5.45	3.75	6.07	5.59	11.02	3.22	6.23
NMP 90280	Yabroud	f	s	52	51	41.8	38.0	18.6	9.5	17.37	16.82	8.88	3.66	8.33	5.62	3.75	6.22	5.82	10.87	2.82	6.27
NMP 90281	Yabroud	m	a	54	48	43.2	38.7	17.4	8.5	17.53	16.17	9.28	3.58	8.57	5.54	3.88	6.36	5.85	11.19	3.02	6.27
NMP 90282	Yabroud	m	s	52	44	42.2	40.0	18.0	7.5	–	–	–	–	–	–	–	–	–	–	–	–
Miniopterus schreibersii																					
MNHN 1876-337	Lattaquie	m	–	–	–	45.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MNHN 1876-338	Lattaquie	f	–	–	–	45.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NMP 48861	Talsh’hab	m	a	55	60	45.9	12.0	6.3	10.2	15.17	14.67	8.52	3.55	8.03	6.33	4.58	6.34	6.11	10.75	2.57	6.28
NMP 48873	Q. Hosn	f	a	55	60	45.8	12.5	5.3	13.0	15.25	14.54	8.64	3.57	8.01	6.28	4.53	6.37	5.87	10.67	2.67	6.16
NMP 48880	Safita	f	L	60	55	44.4	13.0	5.4	13.1	15.12	14.58	8.55	3.67	7.93	6.27	4.62	6.48	6.07	10.83	2.60	6.34
NMP 48881	Safita	f	L	59	55	44.5	12.8	5.6	13.0	14.77	14.48	8.59	3.70	8.02	6.22	4.69	6.41	5.92	10.76	2.57	6.34
NMP 48882	Safita	f	L	58	55	45.1	11.5	5.8	14.0	14.93	14.65	8.62	3.58	8.04	6.18	4.75	6.47	6.16	10.76	2.58	6.52
NMP 48883	Safita	f	L	58	58	45.0	12.7	6.3	17.2	14.78	14.40	8.75	3.65	8.22	6.17	4.73	6.28	5.85	10.64	2.58	6.27
NMP 49989	Q. Hosn	f	a	–	–	–	–	–	–	14.74	14.42	8.53	3.55	7.87	6.03	4.50	6.48	5.82	10.62	2.51	6.28
NMW 2339	Halab	m	a	–	–	–	–	–	–	15.63	15.28	8.95	3.67	8.17	–	–	–	6.12	11.25	–	6.53
NMW 22088	Halab	m	a	56	55	45.6	10.9	4.6	11.5	15.45	14.93	8.72	3.67	8.17	–	–	–	5.97	10.97	–	6.35
NMW 22089	Halab	f	a	58	57	47.3	11.0	4.9	13.0	15.37	15.05	9.02	3.62	8.17	–	–	–	6.01	11.25	–	6.42
NMW 22090	Halab	f	a	60	54	46.9	10.0	4.9	14.0	15.60	15.12	8.87	3.65	8.20	–	–	–	6.10	10.95	–	6.40
NMW 22091	Halab	m	a	61	54	46.3	10.0	4.6	13.0	15.84	15.42	9.02	3.68	8.32	–	–	–	6.13	11.20	–	6.48

coll. No.	site	sex	age	LC	LCd	LAt	LA	LT	G	LCr	LCb	LaZ	LaI	LaN	AN	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Miniopterus schreibersii																					
NMW 22092	Halab	m	a	60	55	46.7	10.1	4.9	13.0	15.65	15.25	8.85	3.62	8.17	–	–	–	6.17	11.02	–	6.51
NMW 22093	Halab	f	a	58	56	48.0	10.2	4.9	12.0	15.57	15.15	–	3.55	8.15	–	–	–	6.12	11.20	–	6.48
NMW 22094	Halab	m	s	56	54	46.1	10.5	5.8	10.5	15.42	15.02	8.96	3.67	8.19	–	–	–	5.87	10.82	–	6.25
NMW 22095	Halab	f	s	59	54	46.4	11.6	6.4	13.0	15.57	14.90	8.93	3.62	8.30	–	–	–	5.92	11.12	–	6.42
NMW 22096	Halab	f	a	58	54	46.1	11.6	6.8	12.0	15.48	15.13	8.82	3.73	8.17	–	–	–	6.12	11.17	–	6.43
NMW 22097	Halab	f	a	57	55	46.6	11.2	6.0	12.0	15.55	15.20	8.97	3.67	8.22	–	–	–	5.92	11.17	–	6.45
NMW 22098	Halab	f	a	57	54	45.4	11.8	6.2	12.0	15.57	15.08	8.83	3.58	8.03	–	–	–	6.08	11.03	–	6.42
NMW 22099	Halab	f	a	57	54	46.1	11.5	6.0	12.0	15.43	15.04	8.73	3.48	8.00	–	–	–	6.10	11.08	–	6.43
NMW 22100	Halab	f	a	58	54	46.1	10.4	5.9	13.0	15.53	15.15	8.75	3.67	8.12	–	–	–	6.07	11.08	–	6.41
NMW 22101	Halab	f	a	57	54	47.1	10.8	5.8	12.0	15.42	14.97	8.65	3.56	7.95	–	–	–	6.05	11.12	–	6.48
NMW 22112	Halab	f	a	63	46	45.7	11.2	4.1	17.0	15.48	15.15	8.72	3.50	7.96	–	–	–	6.10	11.07	–	6.52
NMW 22113	Halab	f	G	57	53	46.6	10.1	4.0	16.0	15.55	15.12	8.72	3.60	8.02	–	–	–	5.97	11.08	–	6.42
NMW 22114	Halab	m	s	62	52	47.1	11.6	5.1	18.0	15.82	15.57	9.00	3.58	8.40	–	–	–	6.18	11.42	–	6.53
NMW 22115	Halab	f	G	62	53	45.9	11.1	5.6	15.0	15.27	14.90	8.72	3.57	8.07	–	–	–	5.93	10.92	–	6.33
NMW 22116	Halab	f	G	61	56	46.9	11.0	5.0	16.0	15.20	14.90	8.62	3.57	8.02	–	–	–	6.12	10.88	–	6.42
NMW 22117	Halab	m	s	64	54	46.3	10.9	5.9	14.0	15.35	14.88	8.85	3.57	8.17	–	–	–	6.02	11.03	–	6.40
NMW 22118	Halab	f	s	53	54	44.6	11.0	4.3	13.0	15.13	14.75	8.58	3.62	7.92	–	–	–	5.90	10.87	–	6.33
NMW 22119	Halab	m	s	60	53	45.9	11.8	5.5	15.0	15.37	15.03	–	3.62	8.10	–	–	–	6.12	10.97	–	6.38
NMW 22120	Halab	m	s	59	53	46.2	11.1	5.6	14.5	15.37	15.03	–	3.62	8.10	–	–	–	6.12	10.97	–	6.38
NMW 22121	Halab	f	G	61	51	47.0	10.4	5.0	16.0	15.42	14.97	8.76	3.53	7.90	–	–	–	6.13	10.93	–	6.50
NMW 22122	Halab	m	s	60	55	47.0	11.0	4.8	15.0	15.62	15.25	8.93	3.63	8.25	–	–	–	6.12	11.22	–	6.50
NMW 22123	Halab	m	s	58	55	45.8	15.0	5.4	14.5	15.23	14.80	8.92	3.58	8.05	–	–	–	5.90	10.92	–	6.37
NMW 22124	Halab	m	s	59	56	46.1	10.2	4.3	12.0	15.37	14.96	8.84	3.52	7.98	–	–	–	6.03	11.12	–	6.55
NMW 22125	Halab	f	a	64	50	43.9	10.5	6.1	14.5	15.00	14.72	8.65	3.58	7.87	–	–	–	5.73	10.72	–	6.27
NMW 22126	Halab	f	s	62	56	48.2	11.1	6.3	15.0	15.35	14.93	8.83	3.58	8.08	–	–	–	6.00	11.23	–	6.48
NMW 22127	Halab	f	a	61	54	46.4	10.6	6.1	14.5	15.57	15.12	8.82	3.60	8.12	–	–	–	5.92	11.07	–	6.42
NMW 22128	Halab	f	a	57	51	45.3	11.8	6.2	15.5	15.17	14.93	8.82	3.62	8.15	–	–	–	5.88	10.88	–	6.27
NMW 22129	Halab	f	a	56	52	46.1	10.3	6.0	15.0	15.38	15.02	8.88	3.67	8.18	–	–	–	5.83	11.12	–	6.52
NMW 22130	Halab	f	s	57	56	46.0	11.6	5.3	12.0	15.23	14.92	8.87	3.42	8.15	–	–	–	6.02	11.02	–	6.30
NMW 22131	Halab	f	a	58	55	45.9	10.3	6.0	10.5	15.10	14.45	8.60	3.47	8.17	–	–	–	5.97	10.62	–	6.28
NMW 22132	Halab	f	a	61	52	45.0	11.3	6.2	14.5	14.90	14.60	8.58	3.39	7.81	–	–	–	5.87	10.90	–	6.42
NMW 22133	Halab	f	s	61	54	47.2	11.6	6.1	15.0	15.58	14.97	8.82	3.53	8.07	–	–	–	6.07	11.05	–	6.38
NMW 22134	Halab	f	a	62	55	45.5	10.5	5.9	17.0	15.56	15.17	–	3.68	8.17	–	–	–	6.00	11.18	–	6.45
NMW 22135	Halab	m	s	60	50	46.7	11.0	5.5	13.0	15.75	15.30	8.77	3.53	8.00	–	–	–	6.04	11.25	–	6.58
NMW 22136	Halab	m	s	61	52	47.2	11.5	6.1	14.0	15.47	15.12	8.92	3.48	8.21	–	–	–	6.02	11.22	–	6.52
NMW 22137	Halab	m	s	59	56	45.8	12.0	6.2	13.0	15.32	15.02	8.75	3.55	8.12	–	–	–	5.98	11.05	–	6.40
NMW 22138	Halab	m	s	58	56	46.5	12.0	6.5	12.0	15.62	15.27	8.72	3.56	8.18	–	–	–	6.00	11.25	–	6.57
NMW 22139	Halab	f	a	61	56	46.3	11.5	5.5	14.5	15.35	14.82	8.93	3.68	8.15	–	–	–	6.00	11.00	–	6.27
NMW 22140	Halab	f	s	62	56	46.5	11.1	5.7	14.5	15.38	15.02	8.68	3.60	8.15	–	–	–	5.98	11.00	–	6.45
NMW 22141	Halab	f	s	59	55	46.6	12.0	6.1	14.0	15.47	15.07	8.77	3.72	8.18	–	–	–	6.09	11.03	–	6.48
NMW 22142	Halab	f	a	62	56	45.1	11.6	6.0	15.0	15.37	15.07	8.82	3.55	8.12	–	–	–	6.10	11.17	–	6.40
NMW 22143	Halab	f	a	58	53	46.3	11.8	6.7	12.0	15.42	14.92	8.78	3.48	8.02	–	–	–	5.85	10.92	–	6.25
NMW 22144	Halab	f	s	65	58	47.9	12.2	6.8	15.5	15.27	15.00	8.88	3.52	8.13	–	–	–	6.07	11.07	–	6.57

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BOOK REVIEW

MICKOLEIT G.: **Phylogenetische Systematik der Wirbeltiere**. München: Verlag Dr. Friedrich Pfeil, 2004. 671 pp., 675 Figs. Format **170×240** mm. Hardback. ISBN **3-89937-044-9**

Undoubtedly, this is a remarkable book and there are several reasons for such a statement. Perhaps the most obvious is an ostentatious absence of any reference to molecular record and molecular phylogenetics at all – indeed, something very stricking in the time when DNA sequences are often considered to be the only reliable data source for phylogenetic systematics. The story of the book is equally remarkable: it begun at beginning of eighties with an idea to compile the vertebrate volume following the invertebrate and arthropod volumes of Willi Hennig's Tachenbuch des systematischer Zoologie, a brief but apparently one of the most consise reference manual to major clades of invertebrate Animalia, which continuation to vertebrate clades was unfortunately interrupted by Willi Hennig's death in 1976. Gerhard Mickoleit, chief of the zoological collections at the Zoological Institute of University of Tubingen, was appointed to take the task and finally he accomplished it. His book appeared with a 20 years delay, of course, and meanwhile it changed from a pocket reference booklet to a voluminous compendium covering nearly 700 pages of dense print. Nevertheless, the book responded the challenge of the preceeding volumes by Willi Hennig (1984, 1986) quite conclusively. Not only in that it formally respected both the conceptual framework of Hennig's volumes and his way to expose the topics of phylogenetics but, in particular, in that it apparently presents, similarly as the Hennig's book, one of the most consise survey of the topics ever compiled. In comparison to other compendia on similar subject (e.g. Benton 1988, Caroll 1988, Goodrich 1958, Hanken & Hall 1993, Kardong 1995, Pough et al. 2004, Starck 1978, 1979, 1982, Westheide & Rieger 2004, Zieswiler 1976) the reviewed book retains the incipient qualities of a reference manual. It is intended to provide an instant source of a reliable and concise information on every higher taxon of Craniata, for which it is written in a telegraphic-like style without any redundant sentences, supplementary explanations etc. Its arrangement and style is indeed that of a brief reference handbook, yet its volume corresponds rather to the largest compendia of the branch. In short, in amount of the referred information the present book exceeds apparently most of the other currently available compendia. The essential framework of the book is build by a complete list of vertebrate monophyla above the familial level and a survey of the structural characters which substantiate their monophyly. For each taxon of superfamily rank or higher it provides a detailed list of apomorphies, structured with a clear typographic emphasize, together with a list of further significant characters. The lists in the introduction chapters to higher taxa are particularly comprehensive and are supplemented with eidonomic characteristics of the respective clades, accounts of alternative phylogenetic setting of them and summaries on major pathways of structural diversification within the clade.

Though the character choice for diagnoses of the highest taxa cover fine details of various developmental, embryological or physiological characters, in most instances it is restricted onto the morphological and structural characters. Nevertheless, the details on which the descriptive apparatus of the book operates and the spectrum of character systems which are taken in account are indeed fascinating (comp. e.g. structural specificities of sensoric fields of vestibular organ in particular clades, fine angiologic or myologic details, besides of comprehensive account of osteological and function morphological specificities). In all these respects the book provides, at the same time, a concise and extraordinary detailed information on state of all the respective characters in every suprafamia vertebrate clade. For the specialist who needs a reliable and complete information on morphological and comparative setting of a certain vertebrate taxon and/or on a way of variation of particular character over a spectrum of clades, e.g. in search of the phenotypic correlates to phylogenies suggested by molecular records, this book provides exactly that what is he looking for. The excellent and perfectly selected line drawings not only supplement the infomation of the text but enlarge it with a possibility of direct comparisons of various taxa as to states of particular cranial and other character.

Correspondingly to Hennig's volumes, only a limited space is devoted to discussions on relationship among particular monophyla. The phylogenetic hypotheses are in most instances exposed rather as illustration to the content of respective higher taxon than as an analytical output and are restricted to informative cladograms supplemented with lists of references to the multiple literary sources. The basic design of cladograms is quite characteristic of the approach: illustrate rather the state of knowledge and account the unresolved situations than hypothesize on possible relations: where monophyly does not seem to be proved for sure, the polytomies are obivously prefered to expected dichotomies. Typically, the presented phylogenetic hypotheses are explained with phylogenetic meaning of the particular morphological characters and orientation of their phylogentic morphoclines. In that kind information the book is apparently quite a reliable. No wonder, that in more instances the proposed phylogenies do not contradict to up-to-date molecular record or other modern studies which then provide rather resolving of polytomies than a radical controversy to the basic phylogenetic schemes proposed in the reviewed book (comp. e.g. current results on phylogeny of birds: Livezey & Zusi 2007). Where Mickoleit prefers the traditional concepts on classification of particular taxa he stressed the alternative possibilities in text and his list of controversies may provide thus robust background for alternative views of phylogeny forced by unexpected results of molecular phylogenetic studies (comp. e.g position of Dibamidae and Amphisbaenidae in Vidal & Hedges 2005 vs. Micholeit's comments on these taxa). In certain groups, of course, the controversy to the recent classifications basing on molecular data, is apparent. First of all it concerns of mammals where the Mickoleit's strict consequentiality in character selection and absence of any reference to molecular studies or to inferrences based on recently discovered fossil taxa restrain a possibility of immediate of use the book as a university textbook. The same objection could be addressed to the nomenclature of some higher taxa: there is a large number of non-traditional names or alternatives to standard usage and though the meaning and content of them is explicite in most instances a brief nomenclatoric explanation (e.g. authors of the respective names) would be undoubtedly appreciated.

Of course, it was apparently not the intention of the book to discuss problems of nomenclature of higher taxa but to provide a concise account of vertebrate monophyla and their specificities in terms of the phenotypic traits. In that point, the author undoubtedly succeeded to fulfill his intention completely. Perhaps nowhere in the recent literature a reader could get so large amount of concise information on each particular vertebrate taxon and rarely one meets a book which – due to reliability of primary information it reports – appears to be the works which information contect is invariant to temporary changes in taxonomic opinions, methods of phylogenetic inferences etc. A prolonged period of its compilation as well as the author's consequentiality in his own view of topic turned here into a unique quality of the compendium.

For every specialist in vertebrate comparative morphology as well as for every zoologist interested in evolutionary dynamics of vertebrate phenotype and phylogenetic aspects of organismic biology, the "*Phylogenetische Systematik der Wirbeltiere*" may present not only an essential reference manual but a particularly rich source of inspiration.

Ivan Horáček

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